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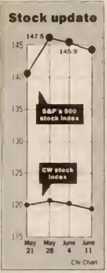
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

# COMPUTERWORLD

$2/COPY; $44/YEAR | JUNE 16, 1986 | VOL. XX, NO. 24



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**Executive Roundtable**
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Voice technology turns a profit for office users/**79**

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**Action by leading retail chains** to sell their own PCs sparks debate over the potential impact on micro vendors that rely on the retail market. **Page 174.**

**Struggling against competitors,** wood products giant Weyerhaeuser Co. is trying to harvest profits from its information systems unit. **Page 108.**

**Kurzweil is scheduled to unveil** next week a desktop voice terminal system. **Page 9.**

**Edson W. Spencer,** Honeywell's chairman, says the real BUNCH companies are those grouped around IBM. **Page 45.**

**Sharing data and resources** across a multivendor network is AT&T's promise with the rollout of its latest version of Unix System V. **Page 14.**

**Data General claims** it will be first to deliver peer-to-peer document distribution via IBM's Systems Network Architecture Distributed Services. **Page 10.**

**Originally scheduled** for an October shipment, the smallest of IBM's 3090 family of mainframes arrived at the first customer site last week. The 3090 Model 150 uniprocessor was delivered Tuesday to Lockheed Aircraft Service Co. in Ontario, Calif., where it will replace an IBM 3031 in supporting computer-aided design and manufacturing, accounting and production. The Model 150 was announced in February, and in April, the schedule was advanced by four months. Lockheed officials expect the system to be on-line today.

**Javelin Software Corp.** next week is expected to unveil an upgrade to its financial analysis software for the IBM Personal Computer. The Javelin 1.1 package can handle up to 16,000 variables per model, supporting up to 8M bytes of random-access memory under expanded memory schemes. The release also can

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# User lifts veil on DEC PC

## VAX-Mate release stalled by network software hitch

**By Douglas Barney**

Digital Equipment Corp.'s still-unannounced IBM Personal Computer AT-compatible workstation was demonstrated for *Computerworld* last week by a user close to DEC, who disclosed that the eagerly awaited VAX-Mate has been further delayed due to software development problems.

The DEC desktop has a front measurement of 16 inches and is 15½ inches deep (see illustration page 12). The 13-inch monitor can swivel up and down and has a ratchet-type device to keep it in place. In addition, the monitor unit, which includes the floppy disk drive, can attach to the

See **USER** page 12

# Users: Minis for central DP only

**By James Connolly**

DELRAN, N.J. — Advocates of departmental systems have yet to win their share of a minicomputer market still dominated by systems that serve a complete organization, according to a recent survey of minicomputer users.

While IBM and other vendors may advertise minis such as the IBM System/36 as departmental processors, only 11% of the 2,338 surveyed users — 587 of whom run the System/36 — classified their systems as such, compared with 86% who said they run organizational systems, Datapro Research Corp. officials said.

See **USERS** page 54

# IBM splash expected to launch NCC

**By James Connolly**

LAS VEGAS — IBM plans to heat up today what was anticipated to be a quiet 1986 National Computer Conference with a chain of product introductions expected to realign the company's mid-range System/36 and 38 product families.

IBM's anticipated activity will run counter to that of many traditional NCC exhibitors, which have dropped out of this year's show. These include most leading minicomputer manufacturers and numerous microcomputer software vendors.

In addition to its expected announcement of top-end models for the System/36 and 38 lines, industry observers say they believe IBM will introduce features that could signal an eventual merger of those families and also roll out other products such as a replacement for its 3370 disk drive.

Despite the exhibitor drop-off, IBM's will not be the only new product activity at NCC this week. Other companies planning introductions include the following:

- Nixdorf Computer Corp., with an IBM Personal Computer XT-class system and two competitors for the System/36 (see story page 4).
- Memorex Corp., with an IBM 3480-compatible tape cartridge.
- NEC Information Systems, Inc., with its first Unix-based multiuser system.
- Sytek, Inc., with two new products for its System 2000 line of large-scale broadband networks.
- Bridge Communications, Inc., previously specializing in Ethernet local-area networks, announcing its first IBM Token-Ring network-based product.
- Britton Lee, Inc., with an office-scale relational data base system.
- Zenith Data Systems Corp., demon-

See **IBM** page 6

## CW EXCLUSIVE

# *Net conflict: Macintosh execs clash with MS-DOS managers*

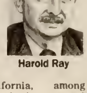
**By Peggy Watt**

SAN ONOFRE, Calif. — Reconciling the mouse-driven world of Apple Computer, Inc.'s user-friendly Macintosh with the conventional reality of an organization committed to the Microsoft Corp. MS-DOS architecture demands imagination and adjustment from both the Macintosh-proficient executives and MIS directors.

When Harold Ray, vice-president of Southern California Edison and site manager of the San Onofre Nuclear Generating Station, was offered his choice of microcomputers two years ago, he asked for the Macintosh, which had recently

obscure operating system commands or programs he would use only occasionally, the Macintosh, with its menu-driven interface, was an easy alternative.

Now, two years later, Ray's commitment to the Macintosh has caused problems at his office. The 16-member MIS staff at San Onofre is building a personal computer network with gateways to the mainframe systems in the central processing site at Rosemead, 60 miles north. The electrical utility, which supplies power primarily to Southern California,



**Harold Ray**

struction in El Toro, located between San Onofre and Rosemead.

Southern California Edison is installing a Novell, Inc. local-area network using Advanced Netware software to link 500 microcomputers for application sharing, file transfer, calendar and electronic mail functions, says Russ D. Henderson, nuclear information systems supervisor, who oversees systems at the San Onofre site.

The network itself, a modified token-passing ring, may be among the largest such installations,

# House Judiciary Committee passes electronics privacy bill

## Aims to close wiretap loophole, protect E-mail

**By Mitch Betts**

WASHINGTON, D.C. — The Judiciary Committee of the U.S. House of Representatives last week approved a privacy bill intended to protect data communications from interceptions and unauthorized disclosures.

The committee passed an amended version of the Electronic Communications Privacy Act of 1986 by a 36-0 vote and sent it to the House for action in the next few weeks. A companion bill is pending in the Senate Judiciary Committee.

The bill is aimed at closing a loophole in the existing federal wiretap statute that protects oral telecommunications but not data communications. The new bill would prohibit the interception of data communications, such as electronic mail and bulk data transfers, during transmission and while stored in a computer.

In addition, the measure would prohibit service providers from making unauthorized disclosures of electronic messages and would require government agents to get a court order to obtain electronic messages.

The bill has attracted widespread support from the computer and communications industries and the American Civil Liberties Union. Supporters include the Electronic Mail Association, ADAPSO and the Information Industry Association, as well as AT&T, GTE Telenet, Inc., Digital Equipment Corp. and Electronic Data Systems Corp.

The Department of Justice agreed to support the bill after negotiating amendments designed to reduce the procedural burdens for law-enforcement agents seeking court approval for obtaining electronic communications.

The bill is sponsored by Rep. Robert W. Kastenmeier (D-Wis.) and Sen. Patrick J. Leahy (D-Vt.).

Walter Ulrich, an industry analyst and consultant in Houston, praised Kastenmeier and Leahy for "taking action on this now, on a proactive rather than reactive basis." He said there have been no major privacy abuses publicized so far, but the electronic mail industry hopes to head off problems in the future.

"Right now, many forms of electronic mail are in legal limbo. Somebody could electronically access messages and read them, and it's not clear that they have violated a law or that there is any form of redress for the party intruded upon," Ulrich said.

Ulrich and Michael F. Cavanagh, executive director of the Electronic Mail Association, said all signs point to final enactment of the bill this year.

# HP to trim 1,500 from work force through voluntary, early retirements

PALO ALTO, Calif. — Hewlett-Packard Co. is hoping to trim about 1,500 employees from its work force by October through voluntary severance and enhanced early retirement programs.

The two programs, announced by HP last week, are designed to address "work-force imbalances" at the company's 45 manufacturing facilities in the U.S., which the company says are manufacturing fewer components in-house.

"It would be a mistake to call this part of our continued effort to reduce employment," HP spokesman Roy Verley told *Computerworld*. "This is related to changes in our business and is not really a response to how we did in the second quarter."

HP already has an early retirement program for 15-year veterans age 55 or older. The voluntary program announced last week gives eligible employees an additional two weeks salary for every year of employment up to a maximum one-year salary. About 1,800 HP employees today qualify for early retirement, the company said.

The voluntary severance program applies to predetermined HP divisions. Workers will be given six months severance and two weeks salary for every year of employment for a maximum of one year's salary.

In other news at HP last week, Spectrum designer William Worley left the company to join the Dana Group, a Sunnyvale, Calif., start-up company founded by former Convergent Technologies, Inc. President Allen Michels. The company is planning to manufacture a personal supercomputer.

— **Maura McEnaney**

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# TURBO

## Why are SYBACK & SyncSort CMS the fastest things on no wheels?

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## Arrange a test drive.

You say you've always had very simple tastes? All you ever wanted was the best?

**Well, step into our showroom and kick a few tires! We'll show you two programs that are the Ferrari and Lamborghini of VM programs.**

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If you'd like to put a little high technology in your VM tank, give us a call. We might even take your used VM dump-restore or sort program as a trade-in!

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**NEWS**

# Nixdorf to introduce micro, mid-range products at NCC

## Will also add software for 4300-compatible

**By James Connolly**

WALTHAM, Mass. — Nixdorf Computer Corp. plans a multifaceted introduction today with the announcement of new systems to challenge the IBM Personal Computer XT and the IBM System/36, as well as operating system enhancements for its IBM 4300-class computers.

Introduced in conjunction with the 1986 National Computer Conference, the systems are said to provide storage and performance gains over existing Nixdorf products, while the operating system enhancements allow the packaging of several previously separate components with a menu facility.

The System/36 competitors are the 8870 Models 25 and 75, which replace the 8870 Models 15 and 65.

**Features increased memory**

The Model 25 reportedly features increased memory, a 41-msec processing time and a new 132M-byte, 5¼-in. Winchester disk drive with twice the capacity of the Model 15's disk drive. The Model 25 supports up to 1M byte of memory, compared with 256K bytes in the Model 15. It also supports up to 10 terminals and five printers.

Nixdorf said its Model 75, with 1M byte of main memory, uses a team-processor concept, under which dedicated processors are used for specialized functions. The Model 75 uses a programmable line controller (PLC) for communications, a hardware arithmetic unit for calculations and an intelligent disk controller (IDC) to speed disk access.

The IDC is a modular multiprocessor with an additional 512K bytes of memory and its own Intel Corp. 80286 16-bit microprocessor and 8-bit processors for memory management.

Nixdorf officials said the IDC is controlled by a real-time multitasking operating system that supports parallel processing between the CPU and the disk drives, thus reducing the number of head movements and increasing disk access rates by up to 40%.

The high end of the 8870 line, the Model 75 will be available initially with two 264M-byte, 14-in. fixed disk drives. Nixdorf said that deliveries of systems supporting two more drives for up to 1G byte of disk storage will begin in 1987.

The Models 25 and 75, as well as existing low-end and mid-range 8870 products run Nixdorf's NIDOS operating system. They will be available during the third quarter of 1986. The basic Model 25, featuring 256K bytes of memory, a streaming mode cassette, a 42M-byte fixed disk, a workstation and a dot matrix printer costs $22,550. The basic Model 75 includes 1M byte of memory, the 512K-byte IDC, the arithmetic unit, a streaming mode tape, a 396M-byte disk drive, a workstation and a 300 line/min printer. It costs $83,600.

**Runs MS-DOS 3.10**

The 8810/35 Desktop Personal Computer is based on an Intel 8088 microprocessor and runs Microsoft Corp.'s MS-DOS 3.10 operating system. It also includes Microsoft's GW-Basic interpreter. The memory is upgradable to 640K bytes. Other options include Intel's 8087 math coprocessor and a 20M-byte hard disk drive.

The basic 8810/35 costs $2,145 with 256K bytes of memory and dual floppy disk drives. Volume shipments are scheduled for October.

For its 8890 line of IBM 4300 compatible systems, Nixdorf is scheduled to announce NIDOS/VSE Easy and NIDOS/VSE DDP. The enhanced operating systems reportedly are workstation oriented and designed to simplify system generation and maintenance by allowing non-DP users to utilize menus.

Nixdorf also announced NIDOS/VSE Assist, a utility that relocates frequently used control routines in microcode when users run NIDOS/VSE Easy.

NIDOS/VSE Easy costs $1,200 per month, NIDOS/VSE DDP costs $295 per month, and NIDOS/VSE Assist can be purchased for $6,140. All three software products are available now.

# Altos adds to 80286-based micro family

**By Peggy Watt**

SAN JOSE, Calif. — Altos Computer Systems, Inc. last week announced two additions to its 80286-based multiuser microcomputer family.

The announcement came amid layoffs intended to lessen the impact of flat earnings for the fourth fiscal quarter, which ends this month.

About 50 employees were laid off without notice in manufacturing, marketing and finance, bringing Altos' employment force to about 700. A company spokesman said about half the layoffs were of temporary staff, made to bring costs in line.

**Altos 3086**

Altos expanded its 80286-based line with the introduction of the 3086, an up-to-32-user system and the six-user 686 system, which will be sold largely through value-added resellers. The price of the mid-range 886 system dropped about 20%.

Earlier members of the processor line, the 1086 and 2086, can be upgraded with a 12.5-MHz CPU board to replace the built-in 8-MHz system, for $2,490.

The Altos 3086 system is based on a 12.5-MHz 80286 microprocessor and includes 4M bytes of random-access memory (RAM), expandable to 8M bytes, in its basic configuration; a 170M-byte small-device interface hard disk drive; 60M-byte streaming tape cartridge; and an Altos IV terminal with three expansion slots. It is scheduled to be available in August, priced at $29,990 in its basic configuration.

The Altos 686 runs at 7.5 MHz and comes in its basic configuraton with 512K bytes of RAM, expandable to 2.5M bytes in 1M-byte increments; and an internal 25M-byte hard disk drive.

The upgrade of Altos' AOM, Version II Plus, combines word processing, spreadsheet, business graphics, data base management, electronic mail and window functions. It is scheduled to be available in July and is priced at $2,000 to $2,500, depending on the number of users.

## TOP OF THE NEWS

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export work sheets to Lotus Development 1-2-3 files, DIF files or other Javelin models. Additionally, the software will import files from 1-2-3 or Lotus' Symphony or import lines from text files as labels.

■

**Sun Microsystems, Inc.'s bid** to make its Network File System an industry standard continues to gain momentum. The workstation vendor announced last week that 20 more vendors, including Hewlett-Packard, Toshiba, NEC, Atex, Inc., Harris and Silicon Graphics, Inc., have recently licensed the software, which reportedly allows users to transparently access files on a network of multivendor sys-

**Second-class postage paid at Framingham, Mass., and additional mailing offices.**

*Computerworld* (ISSN-0010-4841) is published weekly, except: January (5 issues), February (5 issues), March (6 issues), April (5 issues), May (5 issues), July (5 issues), August (5 issues), September (6 issues), October (5 issues), November (5 issues), and a single combined issue for the last week in December and the first week in January by CW Communications/Inc., 375 Cochituate Road, Box 9171, Framingham, Mass. 01701-9171.

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*Computerworld* can be purchased on 35 mm microfilm through University Microfilm Int. Periodical Entry Dept., 300 Zeeb Road, Ann Arbor, Mich. 48106. *Computerworld* is indexed: write to Circulation Dept. for subscription information.

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Subscriber rates: $2.00 a copy; U.S. — $44 a year; Canada, Central & So. America — $110 a year; Europe — $165 a year. all other countries — $245 a year (airmail service). Four weeks notice is required for change of address. Allow six weeks for new subscription service to begin.

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# Many major vendors tighten purse strings, pass up NCC

## Quadram, CDC, Harris no-shows for first time

**By James A. Martin**

Citing the need to tighten dollars spent on general trade shows and concentrate instead on targeted vertical market shows, several of the computer industry's best-known equipment vendors have decided to stay home during this year's National Computer Conference.

The American Federation of Information Processing Societies (AFIPS), the Reston, Va.-based sponsor of NCC, expects about 400 vendors to exhibit in Las Vegas this week, compared with almost 600 last year and more than 700 the year before.

Many vendors will be absent for the first time, including Hayes Microcomputer Products, Inc., Harris Corp., Quadram Corp., Control Data Corp., Datasouth Computer Corp., Mannesmann Tally Corp. and Fox Research, Inc. In addition, Burroughs Corp., which did not attend for several years in the late 1970s, has, after exhibiting last year, dropped out again this year.

Mainframe vendors offered varied reasons for not attending, ranging from the belief that big spenders do not attend the show to the fact that trucking a mainframe across the desert to Las Vegas is difficult.

This year Burroughs has chosen to focus instead on "vertical trade shows as opposed to horizontal hardware shows," the company said.

A CDC spokesman, meanwhile, said slow sales in 1985 caused the company to cut trade show participation, adding that NCC was not singled out for any particular reason. "It was simply a business decision," the spokesman noted.

IBM plug-compatible manufacturers Amdahl Corp. and National Advanced Systems Corp. (NAS) reported that they passed up NCC again this year, although NAS' parent company, National Semiconductor Corp., will attend and exhibit Unix software for its 32000 microprocessor.

**'Customers aren't there'**

"We just don't participate," noted an Amdahl spokesman. "Our customers and prospects just aren't there. Our people are the top executives in the Forbes 500 and Fortune 500-type of companies, and they traditionally aren't at NCC."

An NAS official commented, "It's mostly a question of cost. But most of what we would display are large mainframes and peripherals like disk drives. And you just can't pack up a they aren't that good."

"A lot of computer companies are trying to get the most bang for their buck and are looking for new ways to market their products," said Marty Byrne, marketing manager for AFIPS.

"Some might skip a year and then return the next. It's been a trial-and-error method for a lot of companies that don't know how to best market their products," Byrne said.

**Focus on vertical market**

The majority of vendors queried by *Computerworld* said the need to focus on vertical market shows in the face of dwindling revenues and scaled-back operations was the main reason for not participating in NCC this summer.

"There are so many national shows now that you have to choose, because each one is a drain on the corporation," said Dan Broussard, national sales manager for Fox Research, a local-area network vendor.

His firm will skip NCC this year because previous shows "didn't have the response that we expected. There are too many junior programmers there and not enough people in a decision-making position to buy," Broussard said.

> ***'The timing for NCC is real bad. The spring Comdex show is the first week of May, so new products have already been showcased, and there hasn't been enough development time for more new ones.'***
>
> **— Len Boscarine**
> **Mannesmann Tally Corp.**

"The timing for NCC is real bad," said Len Boscarine, marketing communications manager for Mannesmann Tally, a printer vendor. "The spring Comdex show is the first week of May, so new products have already been showcased, and there hasn't been enough development time for more new ones."

**Competition for attendees**

Because NCC, Comdex/Spring and PC Expo are held within a few months of one another, there is more competition for attendees.

NCC, being in the middle, sometimes loses out, Boscarine said. "People aren't going to take off from their businesses every two months to attend a trade show," he added.

The quality of NCC shows has declined in the last few years, lacking a strong focus and a solid target audience, according to a spokesman for Quadram. "There have been too many attendees there who want to look but not buy," the spokesman added.

Ted Jernigan, a spokesman for Texas Instruments, Inc., said the company has eliminated NCC and Comdex/Spring from its list of trade show activities, opting instead for more focused shows. "We had been evaluating our participation at these shows for several years and decided to focus instead on vertical shows."

# IBM splash to launch NCC

From page 1

strating its IBM-compatible laptop with 3½-in. drive options announced last week (see story page 15).

Although Burroughs Corp. and its subsidiary, Memorex Corp., will skip the show this year, the Memorex Media Products Group, which is another arm of Burroughs, plans a product introduction of its Toughshell tape cartridge, designed for use with IBM 3480-type tape drives.

While not a traditional mainframe vendor, relational data base machine maker Britton Lee tomorrow will use NCC to introduce its RS350, one of a series of systems designed to provide data base management in an office environment.

More typical of the plans for large-systems vendors is the approach taken by Honeywell, Inc., which announced its new line of DPS 6 Plus office systems and One Plus integrated office system on June 3. Honeywell is not expected to show much of its large systems equipment, but will be pushing its 2-week-old office line.

Sperry Corp. also promises to attend and expects to focus its activity on the mini and mid-range lines.

Control Data Corp.'s systems group, which a spokesman says is concentrating on vertical trade shows rather than general-purpose shows, will not attend.

**Software vendors closely located**

Software vendors at NCC this year will be clustered together near the intersections of Halls B and C so people interested in software "will have to walk 200 feet instead of 2,000 looking for the vendors they want to see," says a spokesman for one of the companies attending.

Software vendors that will be showing their latest products include: Cullinet Software, Inc., Cincom Systems, Inc., Relational Technology, Inc., Oracle Corp., Symbolics, Inc. and others.

Oracle Corp. will be demonstrating Version 5 of the Oracle relational data base management system and related fourth-generation language tools and interfaces released last week. It will also demonstrate IBM SQL/RT DB, a DBMS for the RT Personal Computer based on Oracle.

"We nailed down in excess of $1 million in new business at NCC last year," says Kenneth I. Cohen, Oracle's director of product marketing.

Relational Technology, Inc. will be exhibiting its recently announced Ingres/Star [CW, June 9], a distributed data base management system, Release 4.0 of Ingres and the new Ingres graphics package, Vigraph.

Relational Technology spokesman Randy Livingston says NCC is "the one national computer show that really represents the corporate mainframe users. It's important for us in contacting corporate customers."

While most traditional mid-size systems vendors have decided not to show at NCC this year, users of minicomputer equipment will find a variety of third-party products.

Emulex Corp., which makes products for a number of vendors' equipment, will exhibit its wares, says finds that the show benefits its IBM PC-related products much more than its main business, which is Digital Equipment Corp.-related products. "Last year's NCC brought us the highest number of sales leads we have gotten from any show," Heinly says.

Although communications companies are scarce at NCC this year, several of those that have chosen to attend are making significant product announcements.

**LAN vendors busy**

Local-area network (LAN) vendors will be generating most of the communications action on the conference floor, with vendors of IBM PC-based networks predominating.

Sytek, Inc. is unveiling two new products for its System 2000 line of large-scale broadband networks. The 2555 Translator Switch detects and repairs faults in 2550 Translator Units, which move transmissions between different channels on the broadband medium.

"I think you'll find mixed opinions here on NCC," says Sytek President L. George Klaus. "I'm not all that high on it, but you do get a lot of Fortune 500 accounts there."

Bridge Communications, whose specialty until now has been Ethernet local-area networks, will be introducing the first of a series of IBM Token-Ring network products, President William Carrico says. The CS/1-TR enables up to 64 asynchronous or 3270 terminals, IBM PCs and IBM hosts to communicate and share resources over an IBM Token-Ring network, using the Xerox Network Systems communications software.

"Generally we like more vertically oriented data communications shows," Carrico says. He adds, however, that the applications of Bridge products is so broad that "NCC is still valuable to us."

Network Systems Corp. will be exhibiting its Hyperchannel line of high-speed, host-to-host local-area networks. It will also host a presentation on trends in communications, and make a "significant announcement about future plans," a company spokeswoman says.

Among the 25 largest independent suppliers of micro business software, not one will be exhibiting at NCC.

**Hardware announcements**

The situation is a little less grim among hardware suppliers, with IBM, AT&T and Zenith Data Systems among the major players in attendance. However, among these, only Zenith is scheduled to make any substantial product announcments, with the company expected to demonstrate the IBM-compatible laptop with 3½-in. drive options announced last week.

The picture is slightly better among peripheral suppliers. This year's crop of inexpensive laser printers should be in evidence, along with numerous storage products. One highlight among optical storage systems will be the Philips Subsystems & Peripherals, Inc. exhibit of compact-disk read-only memory equipment. A number of conventional disk drives also will debut, including one 5¼-in. system from Micropolis Corp. that provides 382M bytes of storage with an 18-msec average seek time.

*Contributing to this report were staff members Charles Babcock, Eli*

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# Oracle claims 100% performance gain for DBMS Version 5

## Beta-test users report faster loading times

**By Charles Babcock**

BELMONT, Calif. — Beta-site users of Version 5 of the Oracle relational data base management system say it has shown a dramatic improvement in performance.

Oracle Corp. announced the new version last week, claiming a 100% performance improvement, along with upgraded fourth-generation application development tools, company spokesmen said.

"It used to take 20 seconds when we entered the five screens of information on a new policy. Now we can accomplish that in five seconds," said Eddie Abdo, vice-president of data processing at the General Insurance Co. in Miami Beach, Fla.

Glen Sparks, data base programmer analyst at pacemaker producer Intermedics, Inc. in Houston, said Oracle Version 5's performance in loading and exporting data is one of its chief improvements.

"We have consistently loaded 250,000 to 270,000 records in 3 to 4 hours. It used to take 10 to 12 hours. They are using array processing now," Sparks said.

Abdo loaded Version 5 onto General Insurance's VAX 780 without informing his users, and the same day, "everybody came back to ask what happened — Oracle was running so much faster," he said.

Version 5 is now available to run on Digital Equipment Corp.'s VAX line at a price of $48,000 for the VAX 780. Version 5 will be available for IBM's VM operating system in June and for MVS in July, said Kenneth I. Cohen, director of product marketing at Oracle.

The users said the 100% performance improvement claim represents an average that will vary depending on the application. In some cases, applications are running two to four times faster, while in others, such as report writing, there is no evidence of an increase in speed, they said.

Oracle released a test from Nokia Information Systems, a Finnish independent laboratory, that purported to show Oracle outperforming its relational competitor, Ingres, from Relational Technology, Inc.

Using the DeWitt benchmark, Nokia concluded from both single-user and multiuser tests that, on the average, Oracle "was about twice as fast as Ingres," four times faster at deleting single rows and six times faster at updating single rows.

The users cautioned that they would like to see results from a variety of benchmarks before concluding a product is superior in across-the-board applications.

Prior to Version 5, Oracle spokesmen made no claims of superior performance to Ingres.

"Oracle and Ingres are systems that implement the relational model," noted George Schussel, president of Digital Consulting Associates, Inc. in Andover, Mass. Both use a version of IBM's SQL command language, an emerging industry standard, and both appear to share an intense rivalry to capture the emerging relational DBMS market. Both have many installations at VAX sites, while Oracle appears to have the edge at IBM VM sites, Schussel observed.

Schussel said Oracle has lived up to its past performance claims, but he would like to see benchmark results of Version 5 run against Version 4 rather than Ingres.

**OR statement queries**

Sparks said that in queries using an OR statement, such as, "Where doctor equals Jones or Smith," Oracle used to conduct a full table scan. In Version 5, it appears to have optimized that process by creating an index in less than a second; the previous procedure took 20 to 30 minutes, he said.

By writing queries in Fortran, Sparks claimed he is able to take advantage of the performance improvements. Fortran takes advantage of Oracle's new array processing capabilities; using Cobol or Oracle's own fourth-generation language would probably be slower, he said.

In addition to the performance improvement, Oracle announced SQL Forms, an updated version of its Interactive Application Program application generator, Abdo said.

SQL Plus is an interactive command utility for ad hoc data access and report writing, spokesmen said.

SQL Menu allows the creation of menu trees to provide end users with a simple operating environment for their applications.

SQL Graph permits the display of SQL-Retrieve data in bar, pie and line charts.

Easy Link has been enhanced to provide a full-screen, point-and-select interface to Oracle's micro-to-mainframe link.

Pro Ada provides an interface between Oracle and the Ada language.

Oracle also announced three interfaces for its development tools geared to novices, experienced end users and programmers.

Product marketing director Cohen said Oracle has added intelligent sorting to its DBMS, which contributes to the performance improvement, rather than relying on operating system sorts.

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# SPSS enhances statistics tool

## File translation feature for PC software added

**By Eric Bender**

CHICAGO — SPSS, Inc., which claims to have cornered more than half of the worldwide market for microcomputer statistical software with its SPSS/PC+ product, last week introduced data entry and file translation enhancements. SPSS also disclosed several site licensing plans for its IBM Personal Computer software.

Priced at $295, the data entry offering simplifies the development of full-screen high-resolution forms, SPSS said. The on-screen form can be created to look like the paper document on which information has been recorded, simplifying the entry and editing of data by inexperienced users. Alternatively, data can be entered in a spreadsheet-style form.

Designed as an integrated part of SPSS/PC+, the option also permits users to put validity constraints on any field and helps to clean up the data, the vendor said.

The file translation facility, bundled with new shipments of SPSS/PC+, offers import-export capabilities to Lotus Development Corp.'s 1-2-3 and Symphony, Microsoft Corp.'s Multiplan, Micropro International Corp.'s Wordstar, Ashton-Tate's Dbase II and Dbase III. Previously, users could translate files through standard formats such as Data Interchange Format, the company noted.

Additionally, SPSS outlined details of a new site licensing program that allows users to copy SPSS/PC+ and distribute the package internally. These agreements are available with first-year fees of $6,000 for 100 copies and climbing to $15,000 for 600 copies, the company said. Corresponding arrangements also are offered for SPSS/PC+ options.

No other business decision at SPSS has received so much debate, commented President John Grillos; but early results of the site licensing program have been positive. He discounted fears of pirated copies, noting, "It's just not a product that's going to sit on everybody's shelf."

SPSS, which introduced its first statistical product in 1968, has versions of its software running on machines that range from Cray Research, Inc. Cray-2s to IBM Personal Computer XTs, Grillos noted. SPSS/PC+, which debuted in 1984, has sold over 20,000 copies.

The firm's products are in widespread use at universities, where statistical software has become key in business courses, Grillos remarked. SPSS' main competition comes from SAS Institute, Inc., whose products Grillos described as aimed more at programming and information-center-style use than SPSS offerings.

He emphasized SPSS' heavy investments in research and development, which run between 27% and 47% of sales, and discarded any suggestions that larger software vendors could move swiftly into the statistical software arena.

"The applications are brutally difficult, and beyond that, it takes years to establish a reputation. If you're first with the best product, and you don't fall asleep, it doesn't matter who comes after you," he said.

Priced at $795, SPSS/PC+ requires 384K bytes of random-access memory (more for some options), 10M bytes of hard disk storage and a

NEWS

# Kurzweil to announce intelligent voice recognition terminal

## System provides access to minis, mainframes

**By Eric Bender**

WALTHAM, Mass. — Kurzweil Applied Intelligence, Inc. is set to unveil next week the Kurzweil Voice Terminal (KVT), an intelligent terminal designed to provide voice access to applications on mainframes and minicomputers.

Carrying a starting price tag of $9,900, the KVT incorporates the same technology and 1,000-word vocabulary for discrete speech as the firm's year-old Kurzweil Voice System (KVS) attachment for IBM Personal Computers.

However, the preconfigured system integrates KVS hardware with an IBM Personal Computer XT-compatible micro and ASCII communications software in a compact desktop unit.

For customers linking into IBM mainframe environments, a $10,900 model featuring IBM 3270 emulation will also be sold.

The KVT is aimed at customers who can benefit from voice commands for mainframe or minicomputer applications but do not want to assemble a complete system themselves, said Robert Steingart, manager for product marketing.

Additionally, Kurzweil will disclose a cooperative marketing agreement with Ask Computer Systems, Inc., along with software that links the voice commands to Ask's core set of manufacturing software modules and costs $500 per Ask module.

"This is our first relationship with a large supplier of manufacturing software," noted Ed Marcato, marketing operations manager.

Technically sophisticated users can write similar translation software that allows voice commands to drive their own applications, Steingart said. Also, KVT software now allows users to expand the system's vocabulary "on the fly," he said.

Kurzweil's KVS costs $6,500, or $7,500 with training and support. During its first year of shipment, an estimated 250 KVS units have been installed.

Marcato acknowledged that voice recognition has seen only gradual market acceptance but maintained that there are many applications in which customers can recoup their investments within a year.

During internal tests with voice-commanded Ask software, Kurzweil found a 50% increase in order processing transaction throughput and a 40% increase in the speed of general inventory transactions, Marcato said.

About the size of a standard PC XT, the KVT features a single floppy disk drive and a 10M-byte hard disk drive. It will formally bow at the Advanced Manufacturing Systems Expo in Chicago next week.

# Epson printer to offer color

**By Peggy Watt**

TORRANCE, Calif. — Epson America, Inc. will formally introduce this week a new high-speed dot matrix printer with a color capability option.

The EX-800 is Epson's fastest nine-pin printer, capable of printing as fast as 300 char./sec. in draft mode and 54 char./sec. in near-letter-quality mode of 12 char./in.

The 80-col. printer has built-in parallel and serial interfaces to connect to most microcomputers. It comes with an 8K-byte buffer, with a 32K-byte buffer option available.

It also has an eight-button membrane control panel for giving instructions such as type style and type quality directly to the printer instead of going through the software. All software with drivers for Epson's earlier color dot matrix printer, the JX-80, released in 1984, will also run the EX-800, said Dave Ball, technical product manager. However, color commands must be given through the software.

The printer is priced at $749, and the optional, user-installable color cartridge will be priced at less than $100, according to Ball.

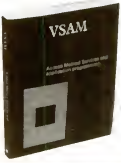
"This is a repositioning of color in our line," Ball said. "We learned with the JX-80 that color is a tremendous asset that needs a marketplace." The expense of color printers has hampered their proliferation, he said.

Epson's newest color printer is priced close to the JX-80's original price of $799, but it includes more options and enhancements, Ball said. Epson recently dropped the JX-80's price to $499, and the firm will continue to support that printer.

The EX-800 comes with a one-year warranty. Epson plans to show the new printer at the 1986 National Computer Conference in Las Vegas this week. According to Ball, shipments will begin within three months.

The EX-800's optional color cartridge includes a four-color ribbon that can produce seven colors (black,

# At last, The VSAM answer book



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# DG Eclipses linked with IBM hosts as peers via SNADS

## Adds to Eclipse's processing ability

By Elisabeth Horwitt

WESTBORO, Mass. — Data General Corp. last week introduced what it claims is the first commercially available non-IBM product that provides peer-to-peer document distribution via IBM's Systems Network Architecture Distributed Services (SNADS). The company also announced memory modules that double the maximum capacity of its Eclipse MV/2000 DC and DS/7500 workstations from 5M bytes to 10M bytes.

SNADS connectivity increases the viability of DG MV Eclipse minicomputers as departmental processors in IBM environments, according to David Lyons, vice-president of business group marketing.

"MIS departments are frustrated with IBM's ability to deliver departmental solutions. We're being invited to submit proposals in that area, but users are telling us they want connectivity into their existing IBM installations," Lyons said.

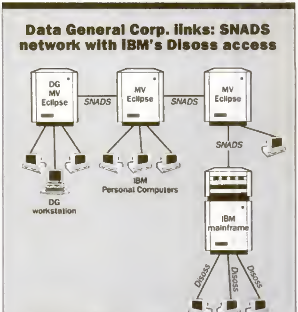
The new offering consists of a software enhancement that implements SNADS on DG's Comprehensive Electronic Office/Document Exchange Architecture (CEO/DXA). Formerly, CEO/DXA enabled users of CEO MV Eclipse-based office automation software to access IBM's Distributed Office Support System (Disoss) document distribution system — but only in terminal mode. This meant that all document transfers between any two nodes had to go through an IBM host.

This type of setup has two disadvantages, according to communications product manager Joseph Clabby. First, it is often inefficient; two nodes in the same office might end up exchanging documents by way of a remote IBM host. Second, handling document transfers for multiple Eclipses puts a heavy strain on the IBM mainframe.

"Ultimately, you don't want to use an IBM host as a message board," commented Molly Upton, a senior analyst at Framingham, Mass.-based consulting company International Data Corp.

Eclipses equipped with the latest version of CEO/DXA can exchange documents directly with one another and with IBM mainframes and departmental processors using SNADS peer-to-peer routing and addressing functions, Clabby said.

JEFF BABINEAU



SNADS provides peer-to-peer document exchange. In IBM's SNA-based Disoss network, all transmissions go through the mainframe.

CW Chart

### Document transfer

Documents can be transferred from point to point or routed among different systems using store-and-forward protocols. Users can access SNADS through the CEO menu-driven interface.

The new CEO/DXA version includes PU2.1 and LU6.2 software packages. PU2.1 controls the physical link between nodes in a SNADS network; LU6.2 provides the basic interface between DG and IBM application programs.

Application Program Interface LU6.2 (APILU), also announced last week, is DG's version of the IBM LU6.2 program-to-program interface. Developers can use APILU to develop links between programs written in DG AOS/VS Cobol, Fortran, PL/I and macro assembler and other programs that conform to the LU6.2 protocol.

Software developers will have to write APILU-based programs before users attain transparent peer-to-peer con- and hosts, Upton said.

Beneficial Data Processing Corp. of Peapack, N.J., perceives a use for APILU, "once applications start being developed," according to Vice-President of Office Information Systems Luciano Corea. "It's a potential solution for which we haven't yet defined the problem."

The company, which provides data processing services to parent Beneficial Corp., uses more than 21 Data General MV/2000 DCs running CEO for electronic mail and other office automation functions. "We have a lot of IBM hardware, but no Disoss or SNADS," Corea said.

An expanded Disoss interface included in enhanced CEO/DXA enables MV Eclipses to access files in IBM host data bases via the Disoss Library Service.

The enhanced CEO/DXA also incorporates Document Interchange Architecture/Document Content Architecture (DIA/DCA), IBM's protocols for generating and packaging documents. As a result, computers running DIA/DCA-compatible software can exchange editable documents or send them to an IBM host Disoss network through an MV Eclipse.

According to DG, prices for the enhanced version of CEO/DXA are the same as for the earlier version, starting at $9,000. APILU is priced from $1,500 to $7,200.

DG also announced the 4M-byte Model 8924-D and 8M-byte Model 8924-E memory modules, which can run on an Eclipse MV/2000 DC system or DS/7500 system. The

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## NEWS

# User runs VAX-Mate

From page 1

CPU case or can be unattached and placed beside the CPU. The look of the machine was of prime importance, according to a January 25, 1985, internal DEC memo that outlined the VAX-Mate strategy.

"The next-generation personal computer from Digital will be a state-of-the-art design achieving a minimum desktop form factor and elegant user-perceived packaging," the memo said.

Some of the other unique features of VAX-Mate include a modem phone jack and an Ethernet connection on the back of the machine and a vertical floppy disk drive covered by a hinged panel built into the terminal.

Those who have seen the machine were impressed. "I think the system is going to be a great success within the VAX community," a source said.

Analysts say DEC is on the right track with VAX-Mate. "DEC has really been gobbling up the mid-range, but the thing that has been missing is a desktop strategy," said Michael Goulde, a market analyst with the Yankee Group, a Boston-based research firm.

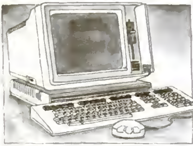
"It was only a matter of time before they entered that market with a compatible offering that had added the value of communications into the DEC architecture," he said.

"I think its a great idea. What DEC is saying is, 'Hey, we've got this great customer base, let's just keep giving them products that interact with the other products,' " said Bruce R. Watts, an analyst with Morgan Keegan, Inc., a Memphis, Tenn.-based investment firm. "It is a very innovative product that, at least at the outset, will especially be attractive to the existing customer base."

VAX-Mate is based on the Intel Corp. 80286 microprocessor, comes bundled with a DEC-modified version of Microsoft Corp.'s Windows operating environment and communicates with larger systems through VT220 emulation.

DEC's VT220 emulation package is not available on IBM personal computers. Because VAX-Mate makes extensive use of Windows, it comes with a round three-button mouse. The VAX-Mate uses a standard VT220 keyboard.

Despite the non-IBM standard keyboard, a source who has used the machine reports no compatibility problems running off-the-shelf IBM-compatible software.



**Drawing of the DEC VAX-Mate is based on a photo of the unreleased system provided to *Computerworld* by a beta user with the stipulation that the actual photo not be used. DEC itself describes the system as having "state-of-the-art design achieving a minimum desktop form factor and elegant user-percieved packaging."**

Under Microsoft Windows, users can run VT220 sessions and Windows-based applications concurrently. Non-Windows based applications, however, will take up the entire VAX-Mate screen and cannot be run concurrent with VT220 sessions.

"Any Windows-based application can run in a Window, but something like Lotus will take over the whole screen," one of the sources said. Data, however, can be "cut and pasted" from a VAX or Microvax to Lotus 1-2-3 and vice versa.

Although Windows on IBM and compatible personal computers makes extensive use of color, VAX-Mate will not have color capability in its initial form.

Windows on the machine demonstrated to *Computerworld*, however, ran quickly and flawlessly. In order to run color, the video board must be redesigned, and the VAX-Mate CPU case will probably have to be enlarged, a source said.

Once expected to be released in early spring [CW, February 3], VAX-Mate may not be available until late fall, the sources said. The introduction has been delayed because of problems involved in networking the machine to VAX and Microvax computers, they claimed.

"They have had a lot of problems on the hardware side, but most of those are behind them now. The networking software still needs some work," said a source with close ties to DEC.

The current delay centers on difficulty in developing networking software that will reside on VAXs and Microvaxes and allow them to act as file servers for the VAX-Mate.

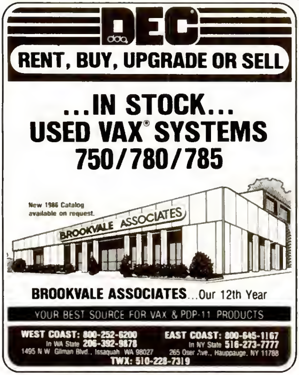
Using thin Ethernet cable and Decnet DOS, the VAX-Mate can store programs and data on DEC's larger systems, but network crashes prompted DEC to rewrite much of the networking software code.

### Configurations

VAX-Mates may be available in various configurations, including one 1.2M-byte floppy disk drive and or a 20M-byte internal hard disk drive, or no drives at all, storing all programs and data on larger systems.

Some shops concerned about the security of corporate information prefer diskless PCs, a source noted.

The machine comes standard with 1M-byte of random-access memory (RAM) that can be boosted to 2M bytes. Memory above 640K bytes can be used as a RAM disk.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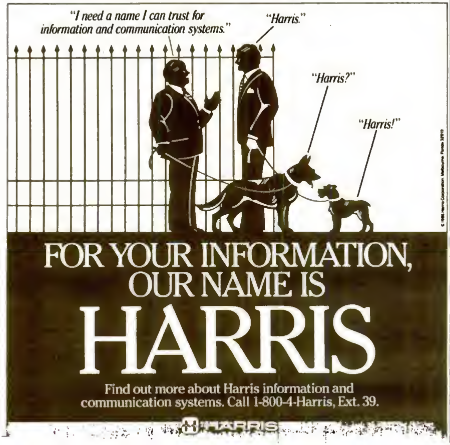
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# New VDT study OKed

By Mitch Betts

WASHINGTON, D.C. — The Reagan administration has approved a revised study of the effects of VDTs on pregnant women, following a controversy over the administration's previous rejection of the long-delayed government study, a spokesman said last week.

Approval by the U.S. Office of Management and Budget (OMB) allows the National Institute for Occupational Safety and Health (NIOSH) to begin its VDT study. The VDT study will compare the pregnancy outcomes of 2,000 VDT users with the pregnan-

not use VDTs [CW, Jan. 14, 1985].

The OMB said its approval is conditional, however. James B. MacRae Jr., chief of OMB's reports management branch, said NIOSH must agree to delete numerous items from its questionnaires, including questions about the effect of VDT exposure on fertility, and must agree to obtain medical records to verify all adverse reproductive outcomes reported on the questionnaires.

Several months ago, the OMB rejected the institute's scientific proposal on grounds that it had design

NEWS

# Computer residual value worth questioned in research report

## Long-term cost 'trivial' next to running expenses

By James Connolly

A $500,000 gain or loss on the residual value of a piece of computer equipment is significant, but when spread over five years, the value can be trivial compared to the potential residual expense of running that system for those five years, according to a theory presented by a research firm.

The theory that residual value may be a minor consideration in comparison to the long-term cost of running a piece of equipment — particularly equipment that requires a significant software investment — was offered in a report released recently by Input based in Mountain View, Calif.

"Questions of whether the residual value of hardware will be 25% or 10% of manufacturer's list price in five years is a trivial consideration compared to the potential residual expense associated with the development of computer and communications systems," the Input report said.

### Mixed responses

When asked about the Input theory, consultants and other market researchers offered mixed responses, with even those in agreement noting that calculating the long-term cost of a system is hampered by the lack of workable formulas.

"You always have to do residuals. But an analysis of the residual cost of systems over the life cycle of the system is going to be the more important consideration, rather than just what the residual value is going to be at the end.

"In making the decision to purchase or to lease, regardless of what the system happens to be, there are other very important factors," said Mountain View, Calif., independent consultant Tim Tyler, who contributed to the Input report.

Tyler suggested that if computer users look at factors such as the cost of maintenance and software development they will shift to simpler systems, rather than get caught up in an increasingly complex and expensive mainframe growth pattern.

He encouraged users to undertake an orderly distribution of processing, by using minicomputers to handle much of their data base activity. He said such an ap- and benefit of installing a distributed network.

There appears to be little agreement as to how important residual values are for typical computer users.

"I think what most of our clients do is acquire equipment with the idea of holding on to it until the residual value will be basically zero, which is a very short time, especially for CPUs these days," said Per Flaatten, information technology research manager for Arthur Andersen & Co. of Chicago.

*'Residual value is very important to these people, because if a residual value of 15% is worth $1.5 million, that buys a lot of programmers.'*

— Dale Kutnick
Gartner Group, Inc.

Flaatten noted that users examine residual values most closely and do most of their residual value forecasting when a product is nearing the end of its life cycle.

He said users are now planning to write off IBM 4381s within three or four years because it is near the end of its new-product life.

### Other contributing factors

Flaatten added that two factors to consider when calculating residual expenses for a system are the tendency for maintenance costs to increase as a system gets older, and the cost of space to house large, older-technology systems.

Analyst Frank Gens of International Data Corp. in Framingham, Mass., noted that the maintenance cost increases cited by Flaatten can be the result of the expense for vendors to keep spare parts inventories for obsolete systems for several years, and can be the result of vendors wanting to force users to buy new systems.

However, he said there is some declining importance of residual values. "I think the reason there has been so much emphasis on hardware costs and values is that the costs probably were the lion's share, or at least the largest part, of an MIS budget. That has changed now that software is so expensive and the greatest cost is people. The reason there is still an emphasis on hardware cost in many cases is that it is a capital expense, so it is easy to measure."

### Important to decision makers

the financial decision makers in user companies but that DP managers base their decisions most often on the reliability of a system and the quality of vendor services.

He added there are three basic types of users with respect to residual value: Large companies that are constantly installing, replacing and selling equipment because of its importance as an asset; large and medium-size firms that keep depreciated equipment in the company by moving older systems into development or low-demand applications; and smaller companies that depend on equipment maintaining its residual value because they cannot afford to depreciate it to zero.

Dale Kutnick, executive vice-president for research at the Gartner Group, Inc. in Stamford, Conn., maintained residual values are very important, particularly for large companies.

"The people who are really concerned about it are big customers. In large companies, the MIS manager is becoming an asset manager. The bottom line plays a significant part in which machine to buy and when to buy it," Kutnick said.

Kutnick noted the residual value question and the issue of complexity are unrelated for those large customers because they have decided how complex their systems will be before they look at new equipment.

"Residual value is very important to these people, because if a residual value of 15% is worth $1.5 million, that buys a lot of programmers," Kutnick added.

He maintained residual values are becoming increasingly important, not only for CPUs, but for tape drives, disk drives and even some major software packages.

He said smaller companies have little control over residual values because their computers, such as the IBM System/36, will be written off within three years.

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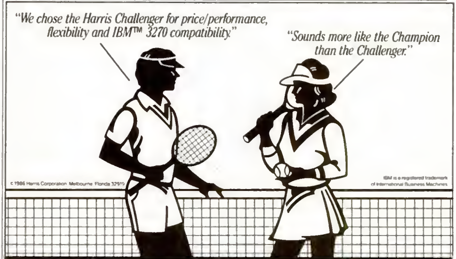
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# AT&T offers Unix System V Release 3.0, pursues OA mart

## Promises ability to share resources across networks

James A. Martin and Eddy Goldberg

ATLANTA — Promising users the ability to share data and office resources across a multivendor network, AT&T Information Systems last week formally unveiled Unix System V Release 3.0 at the Summer 1986 Usenix Conference and Exhibition.

At the conference, AT&T focused on the Streams networking and Remote File Sharing capabilities it had promised in its bid to make Unix a standard [CW, May 26].

"The office automation market wants a standard way of transferring data, files and applications between heterogeneous machines in a standard operating environment," said Dave Sandel, division manager for product marketing support in AT&T's Summit, N.J., office. "Unix System V Release 3.0 provides that capability."

Streams reportedly enables programmers to develop network applications independent of the media or protocol used.

AT&T also announced support for Ethernet and Transmission Control Protocol/Internet Protocol, de facto standards in the Unix community.

Mark Hatch, group manager for networking and operating systems at Apollo Computer, Inc., said AT&T had responded to criticism of earlier Unix versions. "With System V Release 3.0, AT&T has created a Unix system that can pull together all the variations that existed and have hindered portability."

### Targeting business

Hatch said that until System V Release 3.0, University of California at Berkeley's Unix 4.2 was the better system from a technical point of view. However, Unix System V Release 3.0 has blunted complaints that Unix is not suitable for business applications, he said.

For example, with RFS, users can lock files across a network, ensuring data integrity. Lack of file locking has been a standard complaint from business users considering Unix.

An additional new feature in V.3, a shared library function, is said to reduce disk space and memory requirements by allowing one processor to house a data base that can be accessed by other applications. Shared applications and file sharing are only a first step, Hatch said. The next step is to figure out how Unix fits into the business community, where it is still plagued by perceptions that it is difficult to work with. "Until we get some really good Lotus Development Corp. 1-2-3 types of applications for Unix, it will be a problem," he said, adding that highly accessible products like Interleaf, Inc.'s Unix-based publishing systems are a step in that direction.

AT&T has been struggling to wedge Unix into commercial and corporate markets, which are dominated mainly by IBM's PC-DOS and Microsoft Corp.'s MS-DOS operating systems.

"One of the problems Unix systems had in the past was talking to the types of systems used by commercial vendors. By providing Streams, the door is opened to Unix becoming a full partner with all the machines an MIS department is likely to have in its shop," Hatch said.

Hatch said the greatest deficiency in System V Release 3.0 is the lack of windowing and graphics capabilities. "People buy Unix for its portability. Without a standard interface for a windowing system, people lose the benefits of portability," he said. The story is the same for graphics, he added.

Still, AT&T remains publicly optimistic, hoping the

See AT&T page 15

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# Zenith laptop boasts 3½-in. drives, full-size LCD screen

## Aims to outgun PC Convertible

**By Douglas Barney**

NEW YORK — Zenith Data Systems Corp. last week announced the Z-181, a sub-$2,500 laptop that features dual 3½-in. floppy disk drives, and what the firm claims is the industry's first full-size, backlit, LCD screen.

The machine's 3½-in. pop-up floppy disk drives follow on the heels of the IBM PC Convertible, a laptop machine introduced April 2 that uses the smaller drives. All leading microcomputer software vendors announced 3½-in.-drive versions of their packages shortly after the Convertible announcement.

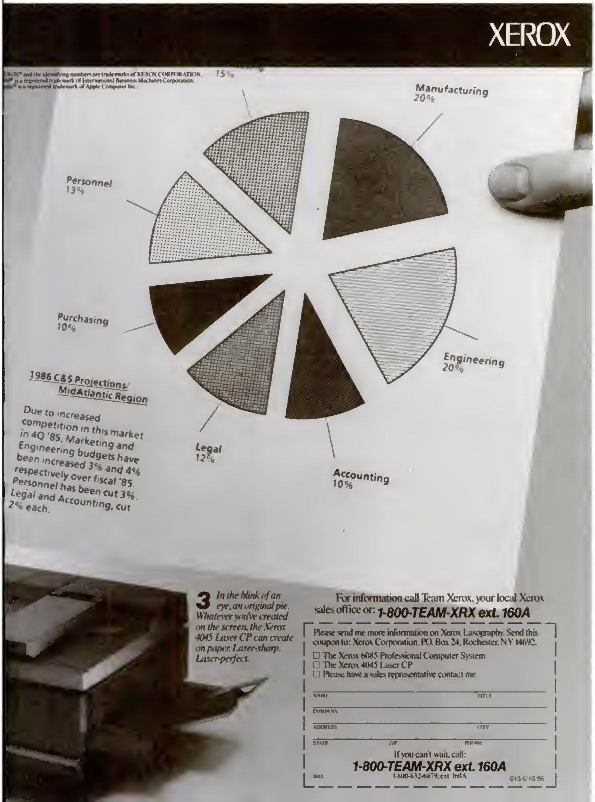
Zenith made headlines when it beat out IBM for a $27.6 million Internal Revenue Service laptop contract in late February. The IRS chose the Zenith Z-171, a laptop that uses standard 5¼-in. disk drives. Zenith will now sell both machines and provide an interface for transferring information from an external 5¼-in. drive to the 3½-in. drives. Zenith officials were not available for comment as of press time.

Some see the Zenith as superior to the IBM PC Convertible. "They are going to do the Convertible the right way. The Convertible has a problem in its ability to get back and forth from the PC world. While there are some links, they are not very well developed," said Aaron Goldberg, vice-president of Microservices for International Data Corp., a Framingham, Mass.-based research firm. "Zenith is promising to do better with a pure RS-232 connection."

The 10½-in. screen on the Z-181 displays 80 characters by 25 lines, with a resolution of 640 by 200 pixels. According to Zenith, the screen has a true aspect ratio, meaning graphics will have the same appearance on the Z-181 as on a standard 12-in. desktop monitor.

The Z-181 comes standard with 640K bytes of random-access memory, uses an Intel Corp. CMOS 80C88 microprocessor running at 4.77 MHz, runs Microsoft Corp. MS-DOS 3.2 and weighs 11.8 pounds.

The machine comes standard with a five-hour rechargeable battery, AC adapter and battery recharger.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# AT&T offers Release 3.0

From page 14

new release will build momentum for the Unix operating system across the board and help to dispel the apathy some markets and users have for Unix.

But a number of Usenix conference attendees randomly queried by *Computerworld* at the exhibit area said they were not familiar with the Release 3.0.

"A lot of people forget AT&T only entered the computer business in March 1984," AT&T's Sandel said.

"The number of Unix applications two years ago was a handful. Today, the number is well over 1,000, and that includes only AT&T and not third-party developers. Also, a number of industry leaders, such as Digital Equipment Corp., have come out and developed products around System V.

"The momentum is growing, and more and more applications will take advantage of the financial, scientific and engineering aspects," Sandel said.

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SEE PAGE 44

# VIEWPOINT

## EDITORIAL

# *Departmental DP: What solution?*

Departmental computing is one of those phrases that everyone in the computer community seems to recognize in word and concept. However, while vendors and consultants debate the merits and claims surrounding departmental computing, a sizeable chunk of users seems to be sending a different message. According to the exclusive Datapro Research Corp. survey reported in this issue of *Computerworld*, only 11% of those questioned use minicomputers for departmental computing.

While this is only a small, albeit scientific, sampling, the sentiment does support the contention that, *at this point*, departmental processing is largely a myth. Despite IBM's billing of the System/36 as *the* strategic office automation product, for example, the vast majority of System/36s and other minicomputers continue to be used as general purpose remote systems.

Despite what vendors claim, integrated office packages like Data General Corp.'s Comprehensive Electronic Office and Digital Equipment Corp.'s All-in-1 run best on general-purpose intermediate computers, most likely tied to a remote mainframe and most often used for single-application electronic mail.

The notion of departmental systems does bring with it an array of problems. To name just two: the lack of software that supports PCs on one hand and simultaneously provides a mainframe link on the other and the lack of control over both costs and the corporate data base.

Meanwhile, vendors have provided too few real solutions, too many "answers" falling far short of the problem that exists: the need for a flexible system that allows MIS managers to allot the right power and tools to each user. The truth is, what is too much computer power for one — whether desktop or departmental — is too little for another.

Recently, though, we have noted encouraging signs signaling the possible transition of departmental computing from myth to reality. Last week Relational Technology, Inc. introduced a new version of its Ingres DBMS, said to allow data bases within various departments or sites to be accessed as one large relational data base. Last month IBM reaffirmed its commitment to department- and work-group-level systems, citing customer surveys that predicted substantial movement of applications and data to mid-range processors.

Those companies that have IBM mainframe data base and application systems and have ported them to DEC's VAX say the latter market is developing rapidly. Cincom Systems, Inc., Information Builders, Inc., Oracle Corp., Relational Technology and others all have versions of their software that run on the VAX; applications developed under them may run under the same brand of the software designed for IBM mainframes.

Here is the precursor to departmental processing: an organization that is accustomed to having mainframe and mini functions and is now trying to link them up in limited ways through software intermediaries.

Departmental computing may not exist yet, but it seems that the chances are good that it will be a major force in the near future: a new portfolio of solutions to corporate

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## LETTERS TO THE EDITOR

### Netview already fulfills predictions

The article, "IBM's Netview links five network packages" [CW, May 26], reported a prediction that IBM would announce Netview support for the System/36 and System/38 in the future. In fact, the initial release of Netview already supports these processors.

One of the major benefits of Netview is the ability to see "alerts." These are special messages that can be generated by equipment throughout a network to warn the central site operator of a failure or to advise him of a special situation. This is part of a Systems Network Architecture facility called Record Formatted Maintenance Statistics, which is supported by IBM on most of its communications products already and by several other vendors. Any products that can support this facility are implicitly supported by Netview. This includes the System/36 and System/38.

**Joseph T. Mohen**
The Teleprocessing Connection, Inc.
Garden City, New York

### Agency cures state's computer ills

When a child burns his hand on a hot stove, he is reluctant to return to the kitchen. This is an analogy that applies to computer users with their first computer system, whether a personal computer, mini or mainframe.

The recent decline in sales and profits bandied about by all data processing vendors may be related to the hot stove syndrome.

If Big Blue and the rest of the pack want to turn this declining trend around, then these vendors must put more emphasis on service and support after the sale and less on up-front packaging and sales promotion. For what good is a Focus software package or Lotus, Hypercube or Megaflop technology when the "box" is broken and there is no one available to fix it?

The Information and Resource Center (IRC), at the Bureau of Central Computer Services, has been helping Maine's state agencies deal with these problems for the past three years, and, like many corporate info centers, the IRC is sometimes the middle man between the agency and the vendor.

A scenario may go something like this: Agency A determines the need for a PC to process a local agency may call the vendor representative, or it may not. Four to six weeks later a covey of boxes arrives with an invoice.

Two days later the office is in chaos, the boss is screaming because nothing is getting done and the user hasn't slept. The agency decides to call the IRC for help. One of the staff rushes over to the agency, sorts the system out, plugs it in, runs diagnostics, makes a few recommendations, provides some on-the-spot training and then returns to the IRC.

A few months later the user calls in a panic again, stating the system doesn't work. The staff member rushes over to the agency again and determines there appears to be a problem with some part of the CPU. The next question the IRC staff member asks — "What type of service agreement do you have?" — always prompts the same answer: "What is a service agreement?"

When the vendor service office contact is made, the result is less than positive. "Well if you drive to our office or mail it to East Podunk, we'll have it back to you in a few weeks."

Throughout this series of events, the agency views the data processing purchase in the same light as that for a typewriter or calculator: Easy to use and able to run by itself. And the vendor made no attempt to point out any difference.

Touch the hot stove? Not all states or organizations have an IRC to bail agencies out. The vendor must take the responsibility of informing all data processing purchasers of the importance of a service contract and what support the customer can expect from the vendor. The alternative is an increased reluctance by all to purchase DP products, and the vendors might just as well throw down their shovels and complete their graves with a backhoe.

**Richard O. Howe**
Department of Finance and Administration
State of Maine

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*Preference will be given to typed, double-spaced letters of fewer than 150 words.*

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# VIEWPOINT

## The decline and fall of programming excellence

By DAVID B. AHL

A good friend who has been involved with computers for the past 25 years or so recently became director of software documentation for a major New York brokerage house. He has been bemoaning the convoluted code that he receives daily from the company's army of high-priced programmers. "Spaghetti code," he called it.

"But don't those people use Cobol?" I asked. "And doesn't that impose some organization on the program?" Replied my friend: "In answer to your first question, yes, and to your second, no. The minute they get to the procedure division, all hell breaks loose."

One study found, for example, that 75% of the programs undertaken by businesses are never used — either because they are never completed or because they are completed too late to be useful.

Moreover, the programs that are completed display more bugs and poorer coding than ever before. Lotus Development Corp., for example, recalled 25,000 copies of Symphony Version 1.1 when it discovered a fatal bug that could cause loss of the user's data.

To what can we attribute this deterioration in programming quality and programmer productivity? There are many causes, but they all seem to fall into one of three categories: people, approach and systems.

*Ahl founded* Creative Computing Magazine *and is the author of more than 20 books on recreational, educational and professional computer applications.*

The people problem begins with programmer training. As the need for programmers has increased, industry has come to rely upon institutions of higher education for its supply of trained coders. But for the most part, these schools do not produce graduates prepared to do state-of-the-art programming. It is one thing to teach theoretical concepts; it is quite another to impart an understanding of the way these theories can be applied — albeit imperfectly — to real-world programming problems.

Another problem is that, with programmers in short supply and high demand, they can command salaries far in excess of those paid to their classmates working in other fields. Thus, when the stress of a particularly large or complex job begins to make life uncomfortable, a young programmer may look for greener, less stressful pastures. When he moves on, he frequently leaves behind an unstructured, undocumented mess. Results: delays and cost overruns.

One manager I met recently has solved many of his personnel problems by hiring only "untrained" people. He has found that liberal arts college graduates with good communications skills can be more easily taught to program than computer scientists can be taught to communicate.

Partially in response to personnel problems and partially because of a desire to get the job done as soon as possible, managers frequently take the position: "I don't care how it looks as long as it works." This I refer to as the approach problem.

Programmers and their managers have never been known for their ability to communicate with one another. For one thing, there is the familiar difference in lifestyle. Managers generally work in spacious offices fitted with handsome furniture, and programmers in untidy cubicles surrounded by motley collections of posters and empty soda cans.

But most dangerous are differences in notions of time and scheduling. Although managers recognize the importance of long-range forecasts, plans for next year usually take a back seat to the time and budget pressures of tomorrow. As one senior executive expressed it, "If you don't make it in the short run, the long run doesn't matter."

This pressure to get the program working — "Forget about the overall system; we'll fit it in later" and "Don't worry about the documentation; we'll get someone else to do it" — leads directly to spaghetti code, incompatible systems and high maintenance costs.

Compounding the problem is the lack of any sound, easy-to-apply method for measuring programmer productivity. Lines-of-code measures tend to penalize coding ingenuity and skill and discourage the use of high-level languages. Cost-per-defect measures imply a curious paradox: As program quality rises, so does the cost per defect. Good programs are penalized, and buggy ones are rewarded with low cost-per-defect ratings.

Not the fault of programmers or managers, but major contributors to poor programming style, are the computer systems themselves — particularly personal computers. As recently as five years ago, the average memory on a PC was about 32K bytes. While this didn't encourage the same efficiency in coding as did the early minicomputers, which often had 4K bytes or fewer, it did force a certain tautness of style — something that has vanished entirely with the current generation of machines sporting 512K bytes and more of memory.

Likewise, multiuser, multitasking, windowing and other advanced features have forced programmers to pay considerably more attention to the environment than to the functionality of the program. This is usually done in the name of user-friendliness, but I question the value of user-friendliness without user-usefulness.

Are there solutions to the problems of declining programming excellence? Yes, at least to some of the problems. Old techniques, including modular coding, concurrent documentation, reuse of parts of old programs and use of the best known algorithms, can help. So can new techniques like rapid prototyping, computer-assisted software development and restructuring engines.

But even the easiest of these require just a bit more time and effort than plunging ahead with the first scheme that comes to mind. And after all, isn't the programmer supposed to get the job done as quickly as possible?

## Avoid swallowing vendor solutions hook, line and sinker

By EFREM MALLACH

There are two kinds of Alaska salmon — pink and white. The white-salmon folks wanted a competitive edge. So they advertised, "Guaranteed not to turn pink in the can!" Not to be outdone, the pink-salmon folks countered: "Guaranteed: No bleach used in processing!"

The moral of the story is simple: There's no magic. We all know that. But our knowing it doesn't stop the salmon people from trying. They show up again and again, always trying to gain a competitive edge by implying that there's something fishy about the other folks' wares.

The computer industry is not immune to salmon peddlers. An example comes up whenever integrated departmental systems are sold. It has to do with counting terminals per processor. It goes something like this:

White-salmon sales rep: "Look how inexpensive our terminals are. If you bought Brand P, you would pay twice as much for each."

Pink salmon sales rep: "Look how many users our Model 30 processor can support. If you bought the comparable Model 850 processor from Brand W, it could only support half as many."

*Mallach is associate professor of computer science at the Boston Col-*

A little common sense tells us this: Nobody's office automation software or operating system (all other things being anywhere near equal) is twice as efficient as anybody else's. Nobody's central processors (all other things being . . .) are twice as cost-effective as anybody else's. And nobody's terminals (ditto) are twice as expensive for the same capability as anyone else's.

As with salmon, there is no magic. Two vendors have been fishing on different sides of the bay and have come up with different shades of salmon. But in the final analysis, both will do the same thing for the user at approximately the same cost.

The simple truth, which vendors often go to great lengths to obscure, is that it takes a certain amount of processing power to support an average office user. You can put the power in one place and hook it to the us-

processing capability for file storage, for message routing and the like. But you don't need as much as you would need if the central system did all the work.

With the first approach, you can use dumb terminals. If you let dumb mean very dumb, you can get them for less than $400 apiece. But you'll need a high-powered central processor to run them.

With the second approach, you need intelligent terminals. In 1986 this usually means a personal computer for word processing and spreadsheet calculations. It looks to the central system for large files, communication to other terminals in the network and to systems outside the network and perhaps for computation-intensive applications.

A given central system under these conditions can easily support twice as many users as it could with dumb terminals. But the processor cost savings will be absorbed by the $1,500 to $2,500, 256K-byte, dual-diskette terminals that run IBM PC-

relevant costs are taken into account. So how should a user choose between them?

#### Centralized system technically efficient

On purely technical grounds, a centralized approach is inherently more efficient and can bring more processing power to bear when it is needed. This can be a great boon to users with large spreadsheets. But giving each user a private processor saves software overhead, and the market has driven PC prices well below the point at which theoretical technical efficiency and comparative processing power would put them.

The answer depends on the individual user's situation. If you have personal computers, there is a lot to be said for keeping them. If your prospective users are not already on PCs, the inherent advantages of a centralized system may be convincing. It's your money, your choice.

The important thing is to understand what is behind the vendor claims, both technically and in terms of the reasons for a given vendor's strategy. Then you can evaluate the claims and the products as they apply to your needs. As the customer,

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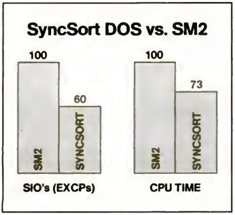

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# SOFTWARE & SERVICES

**SMALL TALK**
Frank Sweet

## Counseling vs. appraisal

There is a passage of dialogue in one of John D. Macdonald's stories, between Travis McGee and his friend Meyer that goes something like this:

McGee: "You know, I have never really fit in. Even when surrounded by friends having a good time, I feel like an outsider. I find myself studying everyone else as if they were specimens. Something's wrong with me."

Meyer: "Good God, man! You mean no one's ever told you? Everybody feels that way. It's part of being human!"

What made me think of that was something a recently promoted manager friend said some weeks ago: that she did not know the difference between appraisal and counseling. I felt like blurting out, "Good God! You mean no one ever told you?" How, I wondered, could she possibly be expected to lead a team of intelligent professionals?

The reason we confuse the two is because we do both at the same time each year when we fill out the form that determines merit increase. But appraisal and counseling differ. The former is objective, easy, nonnegotiable, one-sided and directly affects a paycheck. The latter is subjective, difficult, arguable, shared and indirectly affects a career. The former rates performance. The latter suggests improvement.

Appraisal is when we don our com-

See **COUNSELING** page 24

*Sweet is a free-lance consultant in Jacksonville, Fla. He is the author of* Building Database Applications *and publishes "Boxes and Arrows," a monthly newsletter for Cullinet Software, Inc. IDMS users.*

# Tool manages source code

## Insurance firm assists in development of Control-1

**By Charles Babcock**

NEW YORK — Source-code programs used to be stored in pyramids of punch-card boxes; the earlier the version of the program that you wanted, the deeper you had to dig into the pile.

Today, even that rudimentary level of organization is sometimes lost as programs are stored on-line and programmers delve into them to make ad hoc changes.

A source-code manager like Pansophic Systems, Inc.'s Panvalet or Applied Data Research, Inc.'s Librarian tracks and stores those changes but still requires a high level of programmer participation.

A small company in New York has introduced a product that it claims chronicles the evolution of source code automatically and controls the way a modified source code program goes back into production.

John Abraham, president of Condor Technology, Inc., says his firm's product, Control-1, "compares what source code is being returned vs. what was released and stores only the changes."

From this archive of changes, Control-1 can reconstruct any previous version of the program and reinstitute any current version that has been lost.

ADR's Librarian Release 3.5, with its new Change Control Facility, also stores only changes and restricts the way changes are made to source code but requires a programmer to follow strict procedures, according to users familiar with the product.

Pansophic's Panvalet is even more restrictive. It stores complete versions of programs each time they are modified, using up memory, and moves unused versions of a program out of memory onto tape after a preset time lapse, says David S. Harper, senior assurance systems analyst with Empire Blue Cross, Blue Shield in New York, an early user of Control-1.

"Control-1 is a lot more flexible. Panvalet will only allow you to go so far back," Harper says.

See **TOOL** page 22

**SOFTWARE NOTES**

## Software vendors' warranties longer

A recent survey by **International Data Corp.** of 147 MIS managers found that software vendors provide warranty coverage on their products for a longer period than hardware vendors. About half of the hardware warranties were for three months, while 67% of the software warranties were for 12 months. However, hardware vendors tend to offer on-site support during the warranty period more often than software vendors, the survey found.

■

The **Burroughs Corp.-Sperry Corp.** merger brought a new software compa-

See **NOTES** page 22

# RT/PC Cobol software bows

**By Jeffry Beeler**

PALO ALTO, Calif. — Micro Focus, Inc., convinced that IBM's RT Personal Computer will appeal strongly to business as well as technical users, last week became what is believed to be the first vendor to furnish Cobol software to the multiuser workstation.

At the same time, the UK-based microcomputer software supplier also announced a joint agreement with AT&T to produce programming languages and application development tools for Unix. The products will be designed to make Unix more attractive to commercial users, according to Micro Focus spokesmen.

Paul O'Grady, cofounder and vice-president of worldwide sales, said Micro Focus

See **RT/PC** page 24

**NEW THIS WEEK**

- MacKinney Systems offers CICS utilities
- Enmasse upgrades its data base management system
- For more on these and other new products, see pp. 117-130.

**INSTANT ANALYSIS**

*"An awful lot of companies are flirting with [IBM's] DB2. The trouble is DB2 is an engine that doesn't have anything around it."*

**— David Tory, Computer Associates International, Inc. senior vice-president, planning, before Computer Associates' first user conference in St. Louis**

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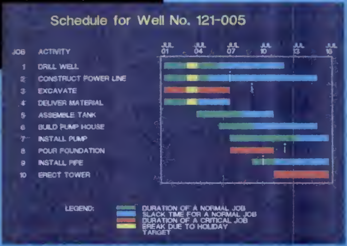
Command ===>
Project Title: Schedule for Well No. 121-005
Start Date (ddmmmyy): 01jul85
Holidays (ddmmmyy): 04jul85
Activity
Duration
Tail
Head
Target
Drill Well
Build Pump House
Install Pipe
Construct Power Line
Excavate
Install Pump
Deliver Material
Assemble Tank
Erect Tower
Pour Foundation



Schedule for Well No. 121-005
JOB
ACTIVITY
DRILL WELL
CONSTRUCT POWER LINE
EXCAVATE
DELIVER MATERIAL
ASSEMBLE TANK
BUILD PUMP HOUSE
INSTALL PUMP
POUR FOUNDATION
INSTALL PIPE
ERECT TOWER
LEGEND:
DURATION OF A NORMAL JOB
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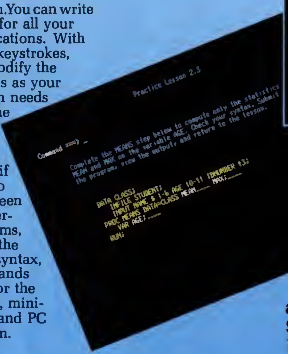

Practice Lesson 2.3
Command ===> _
Complete the MEANS step below to compute only the statistics MEAN and MAX on the variable AGE. Check your syntax. Submit the program, view the output, and return to the lesson.
DATA CLASS;
INFILE STUDENT;
INPUT NAME $ 1-6 AGE 10-11 IDNUMBER 13;
PROC MEANS DATA=CLASS MEAN____ MAX;____
VAR AGE;____
RUN;

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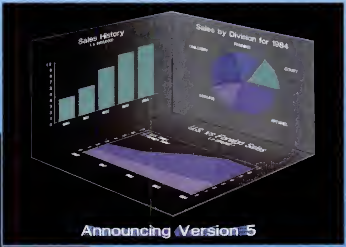

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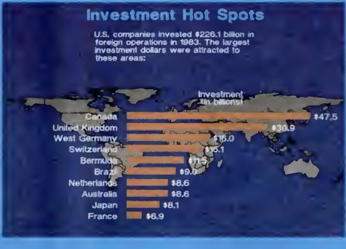

Investment Hot Spots
U.S. companies invested $226.1 billion in foreign operations in 1983. The largest investment dollars were attracted to these areas:
Investment (in billions)
Canada $47.5
United Kingdom $30.9
West Germany $16.0
Switzerland $15.1
Bermuda $11.5
Brazil $9.0
Netherlands $8.6
Australia $8.6
Japan $8.1
France $6.9

The SAS System runs on IBM 370/30xx/43xx and compatible machines under OS, TSO, CMS, DOS/VSE, SSX, and ICCF; on Digital Equipment Corp. VAX™ 8600 and 11/7xx series under VMS™; on Prime Computer, Inc. Prime 50 series under PRIMOS®; on Data General Corp. ECLIPSE® MV series under AOS/VS; on IBM XT/370 and AT/370 under VM/PC; and on IBM PC XT and PC AT under PC DOS. Not all products are available on all operating systems.

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# Notes: DBM tool by ADR, Sharp

From page 19

ny out of the woodwork — **Command Technologies** of Boston. The company's first product will allow a Burroughs mainframe to operate with a Sperry mainframe, said spokesman Franco Vitaliano. As a matter of fact, it allows any computer to work with any other by using artificial intelligence to reformat command structures between operating systems, he claimed. Maybe Burroughs Chairman Michael Blumenthal knows something we don't . . . .

■

**Applied Data Research, Inc.** (ADR) of Princeton, N.J., signed an agreement with **I. P. Sharp Associates** of Toronto to jointly develop Sharp's **Viewpoint** package to operate with ADR's Datacom/DB relational data base management system. Viewpoint is an information center tool used in report writing, graphics, electronic conferencing and telecommunications. The products will be designed to run on the IBM 370 line.

■

**Mitrol, Inc.** of Woburn, Mass., is trying to revitalize its fourth-generation languge, **Mitrol**, which is not well known commercially but has been around since the early 1970s and has enjoyed success among aerospace companies. Users include Lockheed Corp. and TRW, Inc. Mitrol reportedly has the ability to handle large, complicated applications for tracking thousands of small parts. Mitrol has introduced a Multi-Region version to connect as many as 500 online users at a time, said President Michael Regentz. Mitrol runs under MVS.

■

**SAS Institute, Inc.** has made Version 5 of the SAS System available to run under MicroVMS, the operating system of the **Digital Equipment Corp. Microvax II.** The SAS System includes data management, statistical analysis, report writing and application development tools.

■

A user-level interface to IBM's Distributed Office Support System (Disoss) has been announced by **Communications Solutions, Inc.** of San Jose, Calif. Disoss/Talk was designed as an option for its Access/DIA package, said Steve Martinez, Communications Solutions vice-president.

With MULTSESS system support software, handling multiple VTAM applications isn't an amazingly difficult feat. MULTSESS is easy to install, easy to maintain and easy to use, giving you the capability to access multiple VTAM applications—or even two or more connections to one application—from any number of 3270 type terminals in your system.

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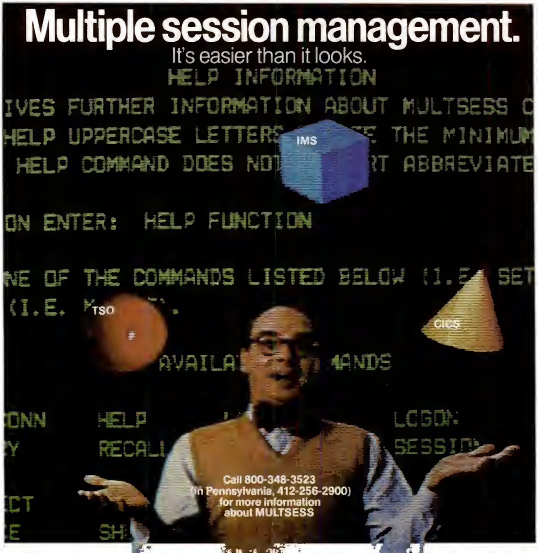

# Tool monitors source codes

From page 19

With both Panvalet and Librarian, naming successive versions of a program is left to the programmer; Control-1 enforces a shop's naming convention automatically, Empire Blue Cross spokesmen say.

The insurance firm had an interest in developing Control-1 because, by state directive, it must maintain a clear audit trail in its use of source code. With 12 million lines of code representing a $1.5 billion asset to the company, the task was enormous, said Victor A. Guarnera, director of data processing quality assurance at Empire Blue Cross.

Abraham, a former associate of Guarnera's at CGA Computers, Inc. of Holmdel, N.J., was given time on an Empire Blue Cross mainframe to develop Control-1 in exchange for a "sweetheart relationship" that enabled Empire Blue Cross to install it early and receive close support, Guarnera said.

#### Load modules must be compiled

With Control-1, production programs or load modules may not be changed at will by programmers. They must be compiled from the modified source code, ensuring that the latest run version has source-code backup, Abraham said.

Control-1 can store up to 10,000 separate sets of changes.

Empire Blue Cross has used Control-1 for eight months, according to Harper.

"Before, if we had a program in production, we couldn't be sure it was created from the source code," he said. With enough modifications, the production program would cease to resemble the source code. And if the production version was lost, it was hard to reconstruct, Harper added.

In another vein, programmers sometimes filed away source code in their own areas. If they left the company, that source could be hard to retrieve, he noted.

"We had a 50-50 chance something might blow in production, and we would have a hard time recovering," Harper said.

#### Reliability said to increase

Under Control-1, Empire Blue Cross has increased production code reliability to between 80% and 90%, he said.

Control-1 is written in IBM assembler language and can work with mainframe security packages such as IBM's RACF, SKK, Inc.'s ACF2 and Computer Associates International, Inc.'s CA/Top Secret. Once a programmer retrieves a source-code program, Control-1 automatically logs any changes and requires a quality assurance division operator to execute a Move command before the source-code version can go back into production, according to Harper. Control-1 can also work with Pansophic's Panvalet, ADR's Librarian and the partitioned data sets of other mainframe software providers, including IBM.

Control-1 was designed to run under MVS and is available immediately. It is priced from $26,000 to

# Cullinet produces...

PRICE: $3.00 APRIL 14, 1986 ISSUE: 061

**InformationWEEK**

THE NEWSMAGAZINE FOR INFORMATION MANAGEMENT A CMP PUBLICATION

## SPECIAL ISSUE

Giving administrators better access to data has prompted a number of information center-type activities at the Veterans Administration, in Washington, D.C., according to James Edwards, director of technical support service. As the arm of the federal government that runs veterans' hospitals and keeps track of benefits for millions of the country's former military personnel, the V.A. has always had to maintain a staggering amount of data

*The V.A.'s Cullinet IDMS/R allows it to do in five minutes tasks that used to take as long as five months.*

Back in the 1960s, the Veterans' Administration created a huge batch-processing system called the Automated Management Information System (AMIS), which contained all the essential data gathered by the agency's numerous field offices. The trouble was that AMIS, which resides on Amdahl Corp. mainframes located at the V.A.'s data center, in Austin, Texas, was built before the era of relational data bases and the notion of enabling nonprogrammers to tap mainframe data with easy-to-use query tools.

The lack of such query tools made it difficult for administrators to look in different ways at the data stored in the AMIS files. For example, getting payroll information on the V.A.'s 250,000 workers was straightforward enough. But taking that data and monitoring minority hiring trends over 12 months required a programmer—and often months of waiting as well.

The V.A. is moving to change that by making it easier for managers to work with data. The administration launched a project 18 months ago to establish a relational data-base management system that would extract the data that departmental users needed most from AMIS. The V.A. chose the IDMS/R data-base management system from Cullinet Software Inc. Using Cullinet's micro-to-mainframe software and IBM personal computers, employees in the Department of Veterans' Benefits can pull out information from the data base without calling on IS to do the job. According to Edwards, a process that could have taken five months now takes five minutes. He expects other departments will soon request that their data be stored on IDMS/R.

At Levi Strauss & Co., the San Francisco-based manufacturer of dungarees and other leisure wear, the duties of the information center are split between mainframe-oriented functions and microcomputer support. Says Jim Wilson, director of the microcomputer support center, "Our dividing line is whether the product is mainframe-based or microcomputer-based."

When it comes to support, however, the line between mainframe-based packages and micro-based packages is becoming increasingly blurred. If micro-to-mainframe products weren't enough, now information center managers must plan strategies to handle a myriad of local-area network products, departmental computing packages, and in some cases integration of the PBX system.

*April 14, 1986 — InformationWEEK — Page 42*

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# Counseling vs. appraisal

From page 19

pany hat; represent the firm and inform the employee of how well he or she performed. It is objective in two senses.

First, its goal is simply to communicate the employer's measurement of the employee's productivity. Employer opinion is the only thing we're trying to communicate.

Any member of a well-knit team knows exactly how productive the others are. It is nonnegotiable and one-sided because the appraisee's own perception cannot count.

It directly affects a paycheck because productivity is the only thing that determines merit increases — not effort, hours worked, how well he communicates, charisma, strength, dexterity, endurance nor any of the other qualities personnel folk put on the form. Productivity. That's all.

Counseling, by contrast, is when we share with a colleague our ideas on how he can become more skillful. It is hard to do because it seems to demand more than we can give.

After all, if I knew the secrets of success and wealth I would be basking on my yacht's foredeck in Rio, not writing computer programs. We can offer useful advice though because we have one great advantage over the person we're counseling — we are on the outside looking in. Counseling is arguable because our advice can be wrong. I recall an analyst who always took longer than expected to negotiate data and functions. The analyst's presentations were disorganized and confusing, so I suggested she take a public speaking course. My reasoning was that her presentations would improve, users would understand her better and negotiations would flow more smoothly.

She followed my advice and learned to deliver excellent presentations. However, her productivity remained at its prior level. She still took too long to deliver goods and her next appraisal reflected it. "But I did what you suggested," she reasonably argued. I apologized, "It didn't work. I guess we'll have to try something else."

### Judging a book by its cover

Another case was the bearded young analyst, Jeff, who insisted on wearing shoulder-length hair, tie-dyed shirts and sandals. His users ran a heavy manufacturing facility. They were hard-boiled, self-made businessmen and would not give Jeff the time of day. He couldn't even get appointments, much less negotiate application features.

I suggested he shave, cut his hair and wear a business suit. He refused, saying my advice infringed on his right of self-expression. "It's up to you," I shrugged. "All I care about is getting the job done."

Eight months later, Jeff was a star performer. The applications he negotiated went up smoothly and with full user support. The manufacturing bosses spoke highly of him. They had grown to respect him and to trust his advice, although he hadn't changed his appearance.

As I gave him a well deserved raise, I could not resist asking how he'd done it. "I started hanging out at the same bar they went to after work. I bought a few rounds of beer and made friends. Now I'm on their bowling team."

Counseling is shared and indirectly affects careers because we must know where an employee is going before advising him how to get there. Career development, in our profession, takes one of two paths; technical specialization or management. So counseling is matched to the individual's career goals.

But the most important point is this: Whether or not our counseling is useful, we must not confuse it with appraisal.

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SOFTWARE GARDEN

# RT/PC Cobol software bows

From page 19

plans to make four of its existing Cobol offerings available for the RT PC, including the following:

- Compact Level II Cobol/ET, an ANSI 74 standard compiler.
- Animator, an application migration aid.
- Forms-2, a screen painter and prototyping tool.
- Upgrade III, a preprocessor and facility for porting Ryan-McFarland Corp. Cobol applications to Compact Level II.

The software tools reflect Micro Focus' belief that the IBM machine may have wider applications than many assumed.

Although Big Blue positioned the RT PC primarily as a workstation for computer-aided design and other technical tasks, "we're already getting users who are demanding business applications for the RT PC," O'Grady said.

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# COMMUNICATIONS

**DATA STREAM**
Daniel Minoli

## Making use of spare FM band

On April 7, 1983, the Federal Communications Commission deregulated the use of frequency modulation (FM) subcarriers, two 10-kHz-wide subchannels on the commercial FM broadcast band used by FM radio stations.

Prior to deregulation, these subchannels could only be used for analog broadcasts such as background music. Now each can be used for any legitimate communications purpose, including broadcast transmission of business data at rates of up to 9.6K bit/sec. Rates of up to 19.2K bit/sec. may become available if proposed new modulation schemes are implemented.

One advantage of subcarrier technology is price; receiving terminals typically cost between $150 and $300. And unlike receive-only stations used in satellite-based broadcasting systems, subcarrier terminals can be hand-held devices that travel with the user.

Of course, a satellite network has a far greater geographic range than a single FM station whose transmission typically covers a 20- to 40-mile radius. But a group of FM operators could agree to interconnect their broadcasts in order to provide a nationwide paging, electronic mail or stock market quotation system.

A business that needed to broadcast data to a large number of regional customers would need to contract with an FM radio station owner to use the

See **USING** page 29

*Minoli is a lecturer with New York University's Information Technology Institute as well as a full-time data communications researcher and strategic planner.*

# Network switch ties LANs to local Centrex facilities

**By Eddy Goldberg**

RESEARCH TRIANGLE PARK, N.C. — Dynamic Network Gateway (DNG-1), a network switch that enables customers to hook up a local-area network to local telephone company Centrex facilities, was recently announced by Northern Telecom, Inc. The DNG-1 will work with Northern Telecom's DMS-100 family of digital central office switches and is part of the company's Meridian Business Service line.

A combination of hardware and software, the DNG-1 "is positioned as a local-area network designed specifically to go at the end of a Centrex loop to offer very high-speed data transport plus voice capabilities," said Bob Dyer, vice-president of market development for Northern Telecom.

The DNG-1 performs voice and data switching over ordinary telephone lines. The lines can be hooked up to a Meridian voice/data workstation or to an IBM Personal Computer and standard telephone set. IBM PCs equipped with Northern Telecom's Lanlink local-area network boards can transmit data at 2.56M bit/sec. over telephone twisted-pair cable. PCs that interface with DNG-1 via an integrated voice/data interface module or RS-232 port can only transmit at 19.2K bit/sec., a company spokesman said. A V.35-based connection between DNG-1 and mainframe hosts supports a rate of 56K bit/sec.

Both local and long-distance voice transmissions are routed by the DNG-1 out to the Centrex system at the local operating company's central office. Local data transmissions are handled solely by the DNG-1. Long-distance data transmissions go out through the DNG-1 to the DMS-100 central office switch either over Datapath, a 19.2K bit/sec. service offered through DMS-100, or over a dedicated 1.54M bit/sec. link.

A customer premise DNG-1 can act as a file, modem or printer server and as a gateway to an X.25 or X.3 packet-switching network. It also can provide an IBM host

See **SWITCH** page 28

## Networks add to user control

**By Elisabeth Horwitt**

ATLANTA — New products recently unveiled by BBN Communications Corp. and Cohesive Network Corp. significantly increase customers' ability to configure and limit access to private networks, spokesmen claimed.

The Network Access System from BBN implements security, access control and connection management features on private packet-switched networks based on the company's equipment. The multilevel security system includes password-based user authentication as well as profiles that determine which network hosts and services can be accessed by a specific user or from a specific port.

See **NETWORK** page 29

## All-In-1-based PBX monitoring system introduced by DEC

**By Elisabeth Horwitt**

ATLANTA — The All-In-1 System for Telecom Management, a software package that enables users to maintain cable inventory and monitor line usage on a wide range of private branch exchange systems, was introduced by Digital Equipment Corp. at the Telecom '86 conference held recently in Atlanta.

Through RS-232 connections the product monitors passing, blocking and queuing for up to 89 PBX switches for accounting and allocation purposes, the company said. The system monitors digital PBXs in real time. The system also pro-

See **ALL-IN-1** page 27

### NEW THIS WEEK

- Concord Data Systems offers modems supporting X.PC
- Cincom Systems ports Net/Master to DOS/VSE environments
- For more on these and other new products, see pp. 117-130.

### INSTANT ANALYSIS

*"The slow emergence of ISDN standards is great for vendors, who can splash ISDN hype around their product literature without having to produce anything solid."*

**— Greg Carlsted, senior industry analyst, Dataquest, Inc., Cupertino, Calif.**

# AT&T enhancements fill gaps in System 75 digital PBX

## Service interfaces will conform to ISDN specs

**By Elisabeth Horwitt**

ATLANTA — Major enhancements to AT&T's digital private branch exchange line, in particular to the low- to mid-range System 75, were recently announced by the company at the Atlanta Telecom '86 conference. The new products are being presented to customers as pre-Integrated Services Digital Network (ISDN) services because they are offered over AT&T interfaces that eventually will conform to ISDN specifications, explained Donald Hirsch added that many of the newly announced features, such as call detailing and screening, offer users a foretaste of ISDN. He admitted that the applications are not new, but claimed that the advent of ISDN will "simplify customer wiring and numbering plans as well as the job of putting applications in place." ISDN also eliminates worry about how to couple the wire to different types of terminals," Hirsch said.

"I think the announcements reflect AT&T's strategy of selling more than just plain PBX lines, which have become a commodity item," said David Terrie, president of Boston-based Newport Consulting. "They're saying, 'Look, we can sell lines at a com-

AT&T announced that two products formerly available only on the System 85 will now be offered with the System 75.

Automatic Call Distributor/Call Management System (ACD/CMS) targets telemarketing departments and other user groups that require special call handling. The product offers configuration control features such as automatic routing of calls to the least busy extension and gives supervisors the ability to reconfigure the system for more efficient line use during peak traffic periods.

CMS software installed on an AT&T 3B minicomputer works with the ACD to provide historical and real-time reports on system use

porting from 15 to 100 telemarketing agents. A CMS for this configuration, including a 3B2 minicomputer and software, costs approximately $40,000.

Audix-Medium is the new System 75 version of AT&T's voice mail system, Audio Information Exchange. The product costs $90,000 for a 16-port system.

"Availability of ACD and Audix on the System 75 is by far the most significant part of AT&T's announcement," said Greg Carlsted, senior industry analyst of Cupertino, Calif., consulting group Dataquest, Inc. "Other PBX vendors have been taking advantage of the fact that the System 75 lacked those

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# All-In-1-based PBX system out

From page 25

vides customizable traffic management reports and maintains cost-allocation reports by cost center or department. It maintains an inventory data base of PBX equipment and cabling and station software features and keeps track of cabling and wiring paths and telephone extensions.

A common menu provides access both to Telecom Management and to basic All-In-1 office automation functions such as report generation and electronic mail, DEC spokesman Richard Tritter said. Designed for the Microvax II or VAX, the product offers users a "total telecommunications management solution," he added.

"Divestiture has cast the telecommunications manager adrift," Tritter said. "Since most companies now treat telecommunications as a profit center rather than a cost center, the manager must look beyond providing basic dial-tone service to doing business reporting, inventory management and chargebacks. And he has to deal with multiple vendors in the process.

"The bridge to All-In-1 office automation functions enables telecommunications managers to generate cost accounting and capacity planning reports and then send them via electronic mail to MIS departments that increasingly want centralized reporting from all sites," Tritter said. He cited a study by Framingham, Mass.-based International Data Corp. stating that 54% of all telecommunications departments now report to MIS, with the figure projected to grow to between 75% and 85% in five years.

A communications manager for a Cambridge, Mass., university who attended Telecom '86 said that while he had not yet seen the DEC product, his organization is currently looking for a more powerful system to help manage and maintain a planned multimedia, multivendor telecommunications facility consisting of approximately 20,000 user stations.

A heavy user of Microvaxes and VAXs, the university currently uses a Microvax II-based PBX facilities management system based on Ingres, a data base management system and report generator from Relational Technology, Inc.

"The system is inadequate even for our current 5,000-station network installation," the communications manager said. He added that he had talked to a number of other managers who had similar facilities management problems.

Technological advances have made customization possible, and yet most commercial telecommunications management systems use generic approaches that do not address organizations' individual needs, the manager complained. "One software company told us they could tailor their system to our needs. That was two years ago; we talked to them today and they haven't done it. And yet their system seems to sell; customers end up making compromises."

The All-In-1 System for Telecom Management is available now. Prices range from $43,860 for a Microvax II to $107,960 for the VAX 8600.

# Networks add to user control

From page 25

The system tracks and generates reports on use of network resources for accounting and billing purposes and maintains a log of failed attempts to access the network.

A Network Access System configuration consists of a Master Database and one or more Access Control Servers. The Master Database maintains a master file of user access information and network resources. Access Control Servers process network log-in requests from packet assembler-disassemblers, switches and gateways.

Pricing for a minimum Network Access System configuration of one Master Database and one Access Control Server is $235,500. Additional servers cost $89,000 each.

The CN-2 network controller from Cohesive performs automatic bandwidth allocation, adaptive route selection, monitoring and fault isolation for up to 36 1.5M bit/sec. T1 links. Cohesive's earlier network controller offering, CN-1, only handles up to 16 T1 lines, according to Chairman Arthur Caisse. The CN-2 can also handle 45M bit/sec. T45 lines, he added.

Both CN-1 and CN-2 are intelligent network processors that automatically allocate new bandwidth, calculate least costly routes, perform error monitoring and take a circuit out of service if error rates exceed a predetermined threshold, according to Caisse.

A human operator can monitor the network from a central terminal hooked up to Operations Management System, a software package that runs on any AT&T Unix V system, according to Cohesive.

The CN-1 and CN-2 are both compatible with local operating company T1 services and AT&T Accunet T1.5 and Customer Control Reconfiguration offerings. The CN-2 is base priced at $70,000.

## CORRECTIONS

Overall U.S. communications expenditures for 1985 were misstated in Daniel Minoli's Packet Switch Per-

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## COMMUNICATIONS

# Switch ties LAN, Centrex

From page 25

gateway by emulating an IBM 3274 controller.

"We will be adding attractive options to DNG-1," company spokesman Tom Hill said. The system will support Integrated Services Digital Network 23B+D primary rates in the future, he added.

Another feature to come is DNG-1 support of Northern Telecom's Dynamic Network Controller, which provides billing, terminal moves and changes and network configuration control both of customer-premise- and central-office-based networks.

The DNG-I also can be offered as a 19.2K bit/sec. service equivalent of a local-area network by local operating companies, Hill noted. The service supports the X.25 and X.3 gateways but not the 3274 interface because of the Second Computer Inquiry decision regulations, he added.

Dyer said the idea behind the DNG-I is to allow telephone companies to increase their Centrex capabilities by offering additional features to their customers. "Data transmission is the hot spot for corporations," he said. Each DNG-1 can support up to 1,200 users, with 400 active at any one time.

According to William Rich, telecommunications analyst at Northern Business Information, Inc. in New York, the market for central office switches will peak at the end of this year and into 1987. If it does, Northern Telecom will have lots of capacity and no place to sell it, Rich also said.

"Northern Telecom ultimately wants to sell more DMS-100s. Anything that makes the DMS-100 more attractive increases its chances," Rich said. He added that the additional capabilities are also a way to sell into their installed base.

The first rollout of the DNG-1, scheduled for second-quarter 1987, will be a stand-alone product that will work with any analog switch or with the DMS-100.

On-site testing of the DNG-I is scheduled for the first quarter of 1987 and availability during second-quarter 1987, the company said. Pricing is targeted at between $250 and $300 per port.

# AT&T fills PBX gaps

From page 25

tracts." System 75, which supports up to 200 user stations, "may dominate the low- to medium-end market for the next five years, according to some people," Carlsted said. "The announcement eliminates its biggest weak points."

A third new System 75-based offering, Hospitality Package, automates call station administration tasks for capital-intensive businesses such as lodging and health care.

The system supports customer service features such as automatic wake-up service and message waiting, as well as single-digit dialing for guest services such as room service.

#### Tracks long-distance calls

It also keeps records of guests' long-distance calls, enables operators to remotely disconnect a station's long-distance service and keeps records of requests for telephone services. A 175-line configuration connecting 150 rooms and 25 administrators costs $800 per line.

Inbound Call Director (ICD) and Outbound Call Director (OCD) are new Speech Response System enhancements that are available on both the System 75 and System 85.

ICD prescreens calls and gathers caller information before passing the call on to an attendant. OCD can automatically place calls from either a computer-generated or manually loaded list.

When a call is answered, the system can ask a series of questions, then pass qualified calls on to an operator. Pricing is unavailable.

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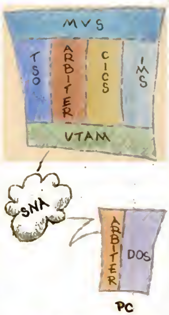

As a subsystem, Arbiter is fully compatible with RACF and other popular security software. It also feeds data into IBM's SMF—data you can use to tune Arbiter. Or use for network capacity planning, usage accounting and auditing.

COMMUNICATIONS

# Using spare FM band

From page 25

extra FM bandwidth. The business would transmit data to the station, perhaps over a dedicated line. At the station, equipment costing between $5,000 and $10,000 would modulate — and possibly compact and encrypt — the data before sending it over the subcarrier along with the FM signal normally broadcast by the station.

Normal radio sets do not pick up the subcarrier information. A subscriber to the service would be provided with a special receiver, tuned to the subcarrier and also with a decoder, if necessary.

Companies such as Pageamerica, Telemet America and Dataspeed use the subcarrier to distribute stock quotes and commodities prices. Customers pay about $300 for terminal devices about the size of a pocket calculator or access the service with IBM Personal Computers or compatibles, which can load the data into spreadsheets for subsequent analysis.

Financial institutions such as Citibank N.A. and Chemical Bank are reportedly using the subcarrier to broadcast banking credit information. Two other possible applications are slow-scan video — using the subcarrier to transmit photographic stills — and fleet dispatching.

It should be noted that FM subcarrier data distribution has several limitations including the following:

• First, it remains one way unless an auxillary return path via a land-based network is provided. This prevents it from being a real alternative to a packet-switched network that handles true interactive communications.

• Second, the 9.6K bit/sec. data rate makes subcarrier technology unsuitable for some applications, such as tranferring large files. Two possible solutions involve data compression and more sophisticated modulation techniques to achieve more bits per hertz.

• Third, FM subcarrier reception suffers in the presence of high-rise buildings. The signal can be strengthened with externally mounted, quality FM antennas costing about $200. At least one company claims to have developed a microprocessor-based indoor antenna that also addresses the problem. This requires that the receiving terminal be stationary.

• Finally, data refreshment delays result from the subcarrier posting data in round-robin fashion — from data base provider to FM station to receiver. The delay is generally in the 1- to 2-minute range, which can be a major problem for financial data but not for most electronic mail distribution. The permissible delay in the cycle and the channel bandwidth determine the maximum number of users.

> *Further deregulation of the wireless technologies should open the way to new applications and services.*

In the next few years, two important developments should significantly improve the viability of FM subcarrier technology. First, further deregulation of the wireless technologies should open the way to new applications and services. And second, radio technology will be digitized.

This will mean improved bandwidth management, security features such as encryption, hardware economies of scale resulting from digital circuitry, very large-scale integration and microcomputers and subcarrier transmissions that are less vulnerable to noise and bandwidth limitations.

These events should help move FM subcarrier technology into the data communications mainstream.

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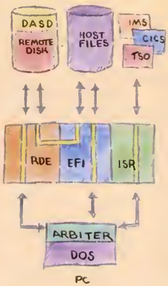

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Announcing
Computerworld's
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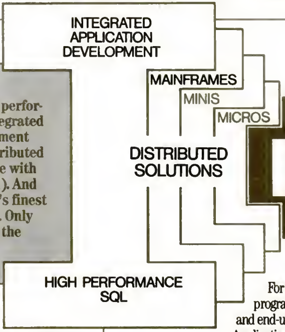
SEE PAGE

# How to Create an Integrated Relational Database Solution.



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# INGRES. SQL Plus A Whole Lot More.

# MICROCOMPUTERS

**SMALL TALK**
Eric Bender

## Better living through silicon

If you rip apart an IBM 3090 mainframe — turn off the pumps that look like they could drive a jet boat up the Colorado River, pull out those 80-pound boards and take a close look at the logic and memory circuits — you find silicon chips with considerable family resemblance to today's microcomputer CPUs.

This family is not really that close; bipolar silicon technology is fundamentally different from the unipolar architecture offered by Intel Corp. and other semiconductor makers. But both give an impressive demonstration of how quickly software designers' worries about processing power and memory limits may dwindle away.

Beginning with the 3080 series, the heart of IBM's high-end mainframes has been what the company calls Thermal Conduction Modules (TCM). These place more than 100 bipolar chips in the top layer of a 30-layer-plus ceramic sandwich.

For the 3090, the sandwich design requires 200,000 elements to meet 200,000 other elements *exactly*.

After the sandwich comes out of the furnace that fuses it together, one side is a rather extreme-looking pincushion that then hooks into a mare's nest of wiring. The flip side carries the heat-removal systems, with each chip nestling near a piston. (How that must have pleased the engineers, to build a computer around pistons!)

In the case of the 3090, put nine of these modules into a board, plug in

See **BETTER** page 32

*Bender is* Computerworld*'s senior editor, microcomputers.*

# Users stand by Unix PCs

## Despite dismal sales, users praise speed, ease of use

**By Douglas Barney**

Although AT&T's Unix PC has made few inroads into the corporate marketplace since its release last year, most users contacted by *Computerworld* were pleased with the machine.

The Unix PC has sold poorly because of its initial inability to run Microsoft Corp. MS-DOS applications, its limited number of Unix applications and the lack of acceptance of Unix on the desktop, analysts and users agreed.

Sales have been so disappointing that Convergent Technologies, Inc., which manufactures the machine for AT&T, recently announced it will reduce its 3B1 (an enhanced version of the Unix PC) and Unix PC shipments by some 30% to $25 million for the second quarter. Last year Convergent shipped 40,000 to 50,000 Unix PCs, analysts said.

According to International Data Corp., a Framingham, Mass.-based research firm, only about 12,000 units were shipped to users by AT&T by year-end 1985. IDC analyst David Moschella said not many more systems have been sold since. Consensus is that most were sold within AT&T.

However, users sound generally satisfied, and some wonder why the machine is not more popular.

"We are using the Unix PCs for church management systems where they need multiuser capabilities. It is primarily because they are settling in on software that only runs on Unix," said Richard Wasilauskas, vice-president of the National Catholic Group Purchasing Association (NCGPA), which bought 250 to 300 Unix PCs. "It has been satisfactory. The churches like it, and there have been no problems with it." However, NCGPA now is considering purchasing AT&T 6300 Plus microcomputers.

Some users are more enthusiastic. "It is a really easy machine to use," said Robert Plotnik, a partner with Maranatha Natural Foods, of Ashland, Ore. Maranatha has

See **USERS** page 32

**NEW THIS WEEK**

- Mega Cadd upgrades Design Board Professional
- For more on this and other new products, see pp. 117-130.

**INSTANT ANALYSIS**

*"Many products don't have user groups; the things that come to mind are Mr. Coffee and Maytag washers. But we in the computer industry have offered products that require our customers to band together."*
— **John Boyd, vice-president, AT&T Computer Systems**

# Supercalc4 offers new interface, more powerful macro capabilities

**By Peggy Watt**

SAN JOSE, Calif. — This month Computer Associates International, Inc. will release Supercalc4, an updated version of the 7-year-old spreadsheet program Supercalc, with new macro capabilities and changes in the interface. The company said a network version of the new release, which runs on Microsoft Corp. MS-DOS systems, will be available in the fall.

Computer Associates also launched its User Maintenance Program, a subscription warranty offer with various options in support, training and upgrades. All buyers of Supercalc4 will get six months of the maintenance program free. A full-year subscription is priced at $100, a fee that will eventually climb to $150, a spokeswoman said.

Supercalc's price also increases to $495 from $395 with the new release. Upgrades are available for $20 in shipping and handling charges to registered owners of Supercalc who bought the program between April 1 and Sept. 1. Users who bought Supercalc before April 1 can get the new version for $100, which includes a year's subscription to the User Maintenance Program.

The upgrade's most noticeable change is a full-word menu in place of the menu that included only the first few letters of commands, said Nancy Twomey, marketing manager of the productivity product line. However, the commands from earlier versions will still work, because all versions of Supercalc are compatible with each oth-

See **SUPERCALC4** page 34

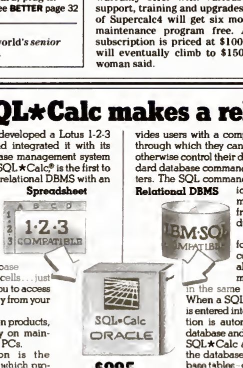
# Oracle's SQL★Calc makes a relational DBMS as easy as 1-2-3.

Oracle Corporation has developed a Lotus 1-2-3 compatible spreadsheet and integrated it with its ORACLE® relational database management system (DBMS). The new product, SQL★Calc®, is the first to combine a mainframe-class relational DBMS with an easy-to-learn and familiar PC spreadsheet user interface.

SQL★Calc is designed for 1-2-3 users who've run out of memory, flexibility and patience. SQL★Calc allows you to put SQL database commands into spreadsheet cells . . . just like formulas. This permits you to access large amounts of data directly from your spreadsheet.

Like all Oracle Corporation products, SQL★Calc runs identically on mainframes, minicomputers and PCs.

SQL★Calc's foundation is the ORACLE relational DBMS, which provides users with a complete set of SQL commands through which they can create, retrieve, modify and otherwise control their data. SQL is the industry standard database command language for large computers. The SQL commands available in ORACLE are identical to the SQL commands in IBM's premier mainframe relational DBMS products, SQL/DS and DB2.



Built on this powerful DBMS foundation is a Lotus 1-2-3 compatible spreadsheet that allows users to put SQL commands into spreadsheet cells in the same way as they enter formulas. When a SQL command for data retrieval is entered into a spreadsheet cell, information is automatically retrieved from the database and placed into the spreadsheet. SQL★Calc also permits users to modify the database—and even create new database tables—directly from the spreadsheet.

SQL★Calc is easy to learn because its menu and command structure are compatible with those of Lotus 1-2-3. And SQL★Calc's ORACLE DBMS requires no supplement. It is vastly more powerful than the database components of 1-2-3, Symphony, Framework, dBase II, dBase III, or any other PC DBMS.

SQL★Calc is available immediately for IBM PC/XTs and ATs for $995.* SQL★Calc will soon be available on a wide variety of systems, including IBM mainframes, DEC, DG, and other superminis, and most UNIX systems.

For further information, or to order your copy of SQL★Calc, call 1-800-345-DBMS. Or write Oracle Corporation, Dept. CS, 20 Davis Drive, Belmont, CA 94002.

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# Users stand by their Unix PCs

From page 31

four terminals running from a Unix PC and uses it for accounting and other business functions. "It is pretty quick. I am impressed with the performance with all the terminals on it," Plotnik said.

Software programmers also are pleased with the desktop Unix PC. "I love it. It is really the most enjoyable computer I have worked on in a while. I basically use it to develop software, which we port over to an IBM PC, and there is no comparison," said Doug Kellogg, director of software development for Unix Development Corp., based in Ashland, Ore.

Kellogg has written software that runs on both the Unix PC and the IBM PC. "The obvious difference is that it runs faster on the Unix PC," Kellog said. "Compared with an IBM PC AT, the Unix PC, even with virtual memory [reading from the disk] was still about twice as fast as the 6 MHz AT," he said.

"At this point the market has still not accepted Unix 100%," acknowledged Dennis Lo, vice-president and director of software development for Sourcemate Information Systems Corp. in Mill Valley, Calif. Nonethelesss, Sourcemate is currently porting its accounting software over to the Unix PC and believes the machine has a good future.

"Some of our customers are moving to Unix, but it is hard to find good accounting software that runs under Unix," Lo said. "We feel that Unix is a great operating system, and we don't have to take too much time to convert our programs from PC-DOS to Unix."

Other vendors agreed that the market is in the very early stages of accepting Unix for desktop systems. "I think AT&T kind of misjudged the sentiment that exists at the one- and two- and three-user machine level for a machine that didn't offer [Lotus Development Corp. 1-2-3] or the things that people are generally more comfortable with," said Nigel Spicer, senior vice-president, sales and marketing, for Alloy Computer Products, Inc. in Framingham, Mass. "When it didn't have DOS, it acquired a bum rap, and it has never quite recovered from that."

Alloy produces the DOS-73 board that allows MS-DOS to run as a task under Unix on the Unix PC. In an effort to boost sales of the machine, AT&T currently offers the DOS-73 board for 99 cents with the purchase of a Unix PC.

Not surprisingly, sales suffer from market confusion over the positioning of the Unix PC, a Unix machine that now runs MS-DOS, and the AT&T 6300 Plus, an MS-DOS machine also currently running Unix.

In a further effort to boost the machine's popularity, AT&T may allow Convergent to sell the Unix PC to other vendors, but AT&T spokesman Barry Campbell said there has been no announcement from AT&T or Convergent about such a move.

# Better living through silicon

From page 31

power and data connections, and you've got one building block for a mainframe.

Near the East Fishkill, N.Y., plant where the TCMs are assembled from scratch, IBM is throwing the better part of a billion dollars into a giant facility for semiconductor manufacturing. In this mammoth three-story structure, the second story is constructed like a building within a building, with high-purity clean rooms braced down to the bedrock against vibration.

An hour's drive south at the huge Yorktown Heights, N.Y., lab, you can get some idea of the role of the new factory, looking at experiments that create ever more compact chips.

IBM has fabricated working devices with half-micron spacing, and scientists are working away on ¼-micron chips — down at the level of molecular chains. Gazing at prototype chips with an electron microscope, you're on a scale where a human hair looks like the New York State Thruway.

This will pay off in memory as well as CPUs. Today 1M-bit chips are in volume production, incorporated in 3090s, and company officials discreetly hint that 4M-bit chips might be around within a year or so.

OK, enough about mainframes. You can see corresponding price/performance advances among the merchant vendors of CMOS components.

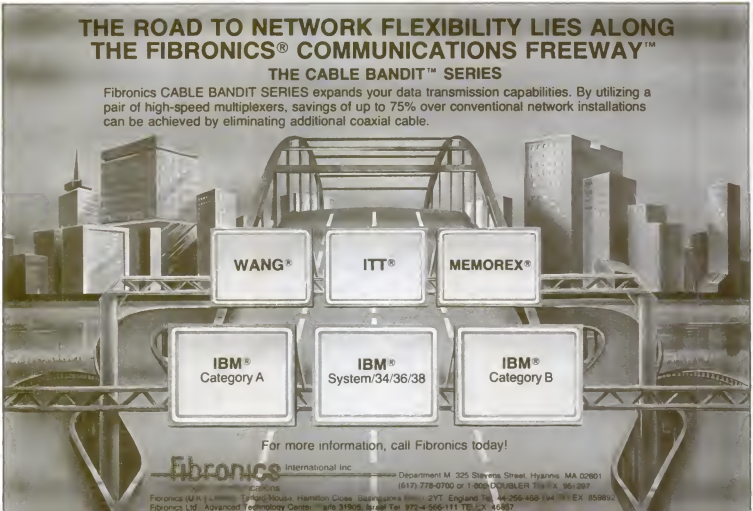
Intel's 80386, which also is rolling off the production line, boasts more than 275,000 transistors. This tiny CPU now chugs along at more than 3 million instructions per second (MIPS). And it fits into your Personal Computer AT's motherboard with a little circuitry here and cache memory there. (Of course, there's no real way to leverage it yet except as a kind of turbo AT.)

Naturally, none of this silicon is free. Those mammoth investments in research and development and production facilities must be paid back. And some ingredients — like gold caps — aren't so cheap. Even the silicon, which once came from Brazilian beaches, but now is more likely to come from a German quartz mine, carries a hefty price tag.

But never mind that. Component costs will take their usual dive, system costs will continue their slide, and a rather grand landscape will greet the software professionals now in college.

This is all so encouraging it's downright scary, particularly when you think of cooperative processing, image management and all the rest of the glitz on its way here. Or when you consider the awesome distributed networks of machines on which all this software will run.

When micros become mainframes, what do mainframes become? And as one senior IBM official asks, "What kind of trauma will it be to run a 50-MIPS machine when you've never done that before?"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# Supercalc4 offerings

From page 31

er. The previous upgrade was to Supercalc3 Release 2 in July 1985.

Supercalc4 also offers more powerful macros, Twomey said. Previously, the program had only file-based macros. Now it has more macros, which are both file- and spreadsheet-based. Computer Associates also added a "learn capability" to write macro commands with a single keystroke.

The newest release is more compatible with other spreadsheets than previous versions and can now directly read files written for both Versions 1A and 2 of Lotus Development Corp. 1-2-3. Additionally, users can label parts of a spreadsheet by a descriptive word instead of coordinates.

"This is the best by far. And I can call up models I created years ago and enhance them on the new version. They've maintained compatibility, and that's phenomenal," said Lee Hoffman, software developer with Laguna Hills, Calif., value-added reseller Philanthrotec, Inc. Hoffman, who has been using Supercalc since his first version on an Osborne1 in 1979, added that Supercalc4 answered most of his wish list of features.

John Doscher, a CPA who works with Imaginaction, Inc., a Menlo Park, Calif., business and financial consulting firm, liked the new financial indexing features in Supercalc4. The Business Simulator, a turnkey financial forecasting system his firm built on Supercalc, will benefit both from this capability and from the continued compatibility among Supercalc versions.

**'Best of both worlds'**

"Supercalc4 offers the best of both worlds," Doscher remarked. "Users of Supercalc3 can upgrade. Users of older programs not used to executing files and full-screen menus can move over and use macros."

He thinks Computer Associates may pick up some Lotus 1-2-3 users with the latest Supercalc. "Lotus users can come over to Supercalc now without having to learn a lot of new commands," he said. "In fact, my first impression was that the new version was a Lotus look-alike. But once I got into it, I realized it's really an enhanced Supercalc with Lotus-like features."

The network version of Supercalc4 is scheduled for release in late summer and will support IBM Netbios-compatible networks, including IBM's PC Network and networks from Novell, Inc. and 3Com Corp.

Computer Associates will not release a separate, multiuser package but will add the networking capability to Supercalc4 for the same price, Twomey added.

Individual users will be able to make their own configurations for use on the network.

The program has never been copy-protected, and the supplier will offer site licenses to corporations through its Corporate License Program, Twomey explained. Computer Associates will count copies of Supercalc purchased earlier and already in use in determining volume of users for site license provisions, she added.

"We err on the side of believing our customers are honest," she said, commenting on the lack of copy protection. "Most companies are careful and police them-

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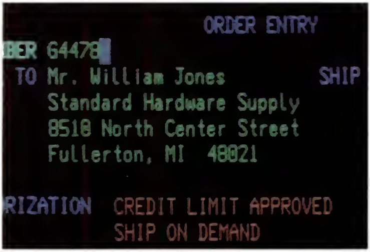
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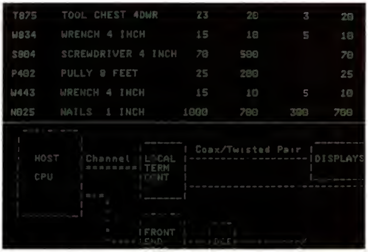
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S804 SCREWDRIVER 4 INCH 70 500 70
P402 PULLY 8 FEET 25 200 25
W443 WRENCH 4 INCH 15 10 5 10
N025 NAILS 1 INCH 1000 700 300 700
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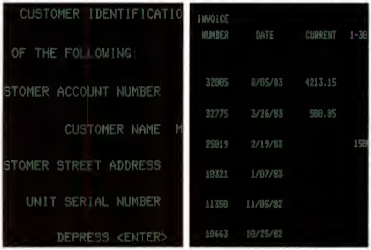
**Set Up Mode/Split Screen & Scrolling:** Provides simultaneous access to two sessions, and determines how much of each session will be seen.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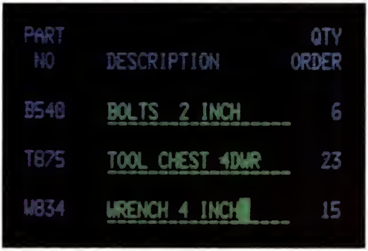
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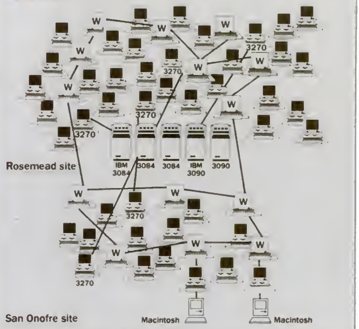
## MICROCOMPUTERS

MITCHELL J. HAYES

**Network challenge: Can MIS evolve Southern California Edison's current system to a micro network?**



3270 represents IBM 3270 Personal Computers.
W represents Wang Laboratories, Inc. dedicated word processors.

**A major problem in linking Southern California Edison's San Onofre site to its Rosemead mainframes entails fitting Apple Macintoshes — preferred by some high-level executives — into the local-area network.**

# *Macintosh execs, managers clash*

From page 1

nodes. The project, undertaken with the assistance of consultant and value-added reseller Vitek, Inc. of San Marcos, Calif., began in February and is about half finished. Approximately 200 micros, including IBM Personal Computers and PC XTs and Compaq Computer Corp. Deskpros and Portables, are on-line now. Others are joining the network at the rate of about 20 each week, Henderson says.

**Henderson**

The network will also include Systems Network Architecture gateways to the host computers in Rosemead — two IBM 3090s and three IBM 3084s. About 25 IBM 3270 PCs at San Onofre also provide a gateway apart from the network. The site still maintains several dozen Wang Laboratories, Inc. dedicated word processors, which can dial up other Wang systems at Rosemead.

The Rosemead staff, while not involved directly in the San Onofre project, is watching its progress with plans to network its own nearly 1,000 PCs later, Henderson adds.

But the Novell network can now link only MS-DOS systems, and Novell declines to say whether a Macintosh connection is in the works. The choice underscores the Macintosh's position as a minority in a Big Blue world — and the complications created when employees, like the four San Onofre devotees, are not prepared to relinquish their devices.

"The senior managers are the ones quite attached to them," Henderson says. He adds that any Mac withdrawal will be made "very gently" — and not until he has a feasible alternative.

Among his options are both hardware and software solutions to make the Macintosh more IBM PC-compatible without sacrificing its own features. This, Henderson confesses, is virtually a contradiction in terms.

Henderson says he is still exploring use of a PC with a graphical interface such as the Graphical Environment Manager (GEM) from Digital Research, Inc. of Monterey, Calif., and Windows from Microsoft Corp.

But, he says, one problem with GEM is that every program on the system shows up on the screen as an icon, creating a virtual forest of icons when using a hard disk or, worse, a network. It even shows icons for some programs the user cannot access. Henderson says he found that Windows shows every program on all drives, cluttering the screen even more.

Even a Macintosh interface to the network would not solve everything; the network interface uses color, inaccessible to the black-and-white Mac, Henderson adds. But he can't just take away the site manager's Macintosh, especially when it has proven to be a useful tool, he says.

"The objective of computers is to keep the users productive, any way we can," says Ken Slagle, manager of material and administrative services and Henderson's supervisor at San Onofre. "If we can keep them on a Mac, we'll try. Otherwise, we'll give them what we can with a PC."

Slagle says the MIS department will support both DOS and Macintosh

# *Macintosh execs clash*

From page 39

> ***'When the top man uses a Mac and does his work on it almost to the final draft, you have more acceptance among the ranks.'***
> — Russ D. Henderson
> Southern California Edison

systems regardless but wants "to streamline our work processes. We're going ahead on the PC-Novell network. If we can get the Mac on, all the better."

For the moment, the micro managers have sewn a patchwork system to let Macintosh users electronically talk to the rest of the company, if in a roundabout way.

Originally, site manager Ray gave printouts from his Macintosh files to his secretary, who rekeyed them into her Wang dedicated word processor, which could then communicate with the Wang system throughout Southern California Edison sites. That was less than optimum, and Ray's secretary switched to an IBM PC.

Now they use Apple's ASCII Maclink to communicate over modems and phone lines from Macintosh to IBM PC, Ray says. A Bluecom bisynchronous communications card from M-H Group of Chicago in her PC XT lets secretary Joanne Bullington send Ray's edited file through a modem to the Wang system.

"It still isn't perfect. There's still certain codes in the PC that come across as garbage in the Wang," Ray says. But so far, it has enabled him to hang onto his Mac.

He has a Southern California Edison Macintosh at home as well, and says he does about one-third of his work there. He even once took the Macintosh on a business trip. Both have been upgraded since their installation and are now Macintosh Plus systems with hard disk drives.

"I'm still a little satellite at the far end of that network," Ray says. "I guess I'm going to have to convert to a PC eventually, but until then, I'm taking a wait-and-see attitude. But I don't think I'm going to be able to interact with that network by sending everything to my secretary."

Besides missing out on direct electronic mail, a non-networked Macintosh will not be able to take advantage of Hewlett-Packard Co. plotters and laser printers and Dest Corp. optical scanners that will be shared on the network.

Ray also has some doubts about a Mac-like PC interface. "I'm not sure whether I'd like an IBM that looks like a Mac," he says. "I guess I'd face that at the time when I have to give up my Mac. But I haven't gotten to that point yet." His department assistant also has a Mac and has a similar arrangement with his secretary.

#### Encouraging micro use

Despite its current stumbling block, the Macintosh has served a purpose by encouraging the use of microcomputers among all levels of workers, Henderson says.

"They've been good because they brought management into innovation, and when the top man uses a Mac and does his work on it almost to the final draft, you have more acceptance among the ranks," Henderson says.

Slagle agrees. "You could say we have an eclectic approach. We're trying anything we can," he says. Ray has "been a strong advocate of office automation," he adds.

Whether it ever joins the network, the Macintosh will not disappear, Henderson says. He uses a Macintosh as a front end to the on-line data base Plato and is evaluating the Mac for in-house

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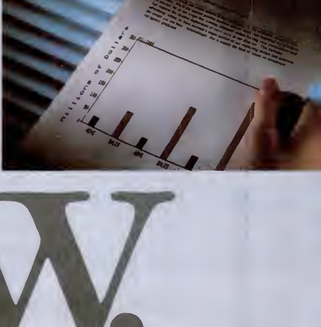

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# SYSTEMS & PERIPHERALS

**HARD TALK**
James Connolly

## Keeping an ear to the ground

The rumble evokes memories of the 1906 San Francisco earthquake. Something is up at IBM, and the world is likely to find out what today or tomorrow.

The rumbling is the sound of what seems like every IBM watcher and minicomputer industry analyst guessing what will become of the System/36 and the System/38. Each observer is offering an opinion, although that opinion frequently seems tailored to jibe with the opinionator's previous predictions.

Even normally silent IBM has fueled speculation by tossing out teaser hints during consultant briefings, by scheduling user briefings on changes to products that haven't been changed in a year and by calling consultants to ask, "Where do you plan to be during NCC week?"

It doesn't take a genius to guess that something is ready to hit the news this week. Now, what will it be? The predictions range from a 32-bit System/36 to a common hardware platform and operating system for the System/36 and 38. As in any predictions, most of the guesswork is based on a few facts and a firm belief that the prognosticator has been right in what he has been saying for two years.

Rather than speculate about details, however, let's take a look at the general direction in which IBM appears to heading.

The signs indicate that there may be good news for those who are weary of IBM running a half-dozen in-

See **KEEPING** page 50

*Connolly is* Computerworld's *senior editor, systems & peripherals.*

# Spencer fights IBM 'bunch'

## Honeywell chief says Blue dominance began in 1980

**By James Connolly**

The BUNCH of the mainframe world is shrinking, with Burroughs Corp. buying Univac (Sperry Corp.), NCR Corp. focusing on intermediate systems and Control Data Corp. suffering financial woes.

Most of those companies shun the BUNCH label, but the top executive at the "H" in BUNCH — Honeywell, Inc.'s Chairman and Chief Executive Officer Edson W. Spencer — almost explodes when the term is mentioned.

"Let me tell you who the BUNCH are. The BUNCH are IBM, Amdahl Corp., Hitachi Ltd. and Fujitsu Ltd., the people who are clustered around IBM's operating system. BUNCH implies that people do things the same way, and those people do," Spencer charges.

"We are the freewheeling entrepreneurs who are charging off in our own direction," he says of Minneapolis-based Honeywell and the other vendors that offer themselves as alternatives to IBM.

Interviewed after Honeywell's introduction of hardware and software product lines for office automation recently, Spencer spoke of Honeywell's strategies and surviving in a world increasingly dominated by IBM.

He says that it was relatively recently that other vendors really began to feel IBM's power. Honeywell continues to rely on the mainframe technology of NEC Corp. but will introduce a new homegrown mainframe soon. Honeywell's best opportunity, according to Spencer, is in its ability to link the data center with the office and the manufacturing and control systems.

"I don't think IBM's power was really there to be recognized until the antitrust suit was settled. During the 1970s, with the rapid growth in the large-user marketplace, all of us were operating in the IBM price umbrella, and they were very conservative in the introduction of new technology and very conservative in pricing," Spencer says.

It was around 1980 and 1981, when IBM and the U.S. Department of Justice were settling the long-running federal antitrust suit against IBM, that other mainframe

See **SPENCER** page 52

# Hitachi doubles drive capacity

**By Donna Raimondi**

SAN BRUNO, Calif. — Hitachi America, Ltd. has announced an 8.8-in. disk drive that costs $14,700 and holds 1G byte of data. The new drive is said to offer twice the capacity of the vendor's current top-end 8.8-in. drive, the DK815-5.

The DK815-10 allows system designers to fit two units side by side in a 19-in. rack for a storage capacity in excess of 2G bytes, the vendor said. The unit uses the enhanced storage module device interface. An intelligent peripheral interface drive and controller are also available.

"There are not a lot of systems that can use the 9-in. drive yet, so I do not think you will see this used much until 1987 or 1988," said storage analyst Dave Vellante of Framingham, Mass.-based International Data Corp.

"It will definitely be important to the mid-scale system market because 9-in. drives tout some of the best reliability figures in the industry," he said. Anybody who uses the Fujitsu America, Inc. Eagle 10½-in. drive should definitely consider a 9-in., he said, because the high-capacity 9-in. drives offer faster access time, high reliability and can be mounted side by side.

In comparing the DK815-10 to the older DK815-5, the vendor said the average access time was reduced from 18 msec to 15 msec, the recording density was increased to 20G bit/in. and mean time between failures was increased from 20,000 to 30,000 hours.

Vellante noted that NEC Corp. and Control Data Corp. are working on similar units and that most minicomputer makers are working on the controllers for them.

**INSIDE**

Fujitsu is set to announce two hard disk drives and an enhanced SCSI controller at NCC/**40**

**NEW THIS WEEK**

- Wang introduces a 32-bit Nacsim-compatible minicomputer
- Alpha Data releases its Atlas 520M-byte hard disk drive
- For more on these and other new products, see pp. 117-130.

**INSTANT ANALYSIS**

*"We're talking about 4 MIPS of power here. That's a pretty powerful machine. Maybe some people call it a minicomputer. Ten years ago that would have been a supercomputer."*

**— Honeywell, Inc. Chairman Edson W. Spencer on his company's DPS 6 Plus office system**

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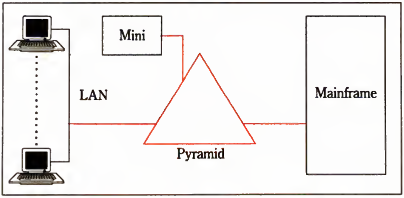

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We do.

Our ISOPROCESSOR™ system boosts aggregate system throughput significantly over conventional uni- or multi-processor architecture approaches. So much so, we outrun a VAX™ 8600 by a factor of one and a half. At two-thirds the cost.

This superior throughput is further enhanced by our optimizing compilers. Which take advantage of another high performance feature, our RISC-based architecture.

Our I/O processors free up the CPU while keeping terminals and disks responsive. So users see nothing but performance, yet there's no overhead to the rest of the system.

Finally, our dualPort™ OSx operating system makes both UNIX® standards (Berkeley 4.2BSD and AT&T's System V) available concurrently. Making the broadest possible choice of software and vendors available as well, while protecting your own software investment.

And because some of our systems never get turned off, we offer 24-hour service and support. Plus extensive training on both hardware and software to insure our customers never get turned off, either.

This combination of features and openness makes our systems ideally suited for three important applications: As data base servers, pc/workstation servers, or software development environments. We'll talk about each one of these applications at length in a series of advertisements.

In the meantime, to learn more about Pyramid systems and the company behind them, contact us at 1295 Charleston Road, P.O. Box 7295, Mountain View, CA 94039-7295. Or call 1-415-965-7200, Ext. 3450.

We'd be very open to hearing from you.

PYRAMID TECHNOLOGY

The Shape of Performance.

# GUESS WHO WINS THE DATA BASE RACE?

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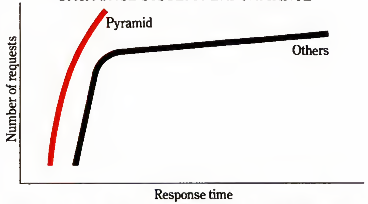
No contest.

When it comes to data base engines, nobody, not DEC,* not HP, not even the mighty IBM,* can out-last, out-blast Pyramid. And the chart below tells the tale.

What it doesn't tell is why. So hold onto your hat.

DATA BASE SYSTEM PERFORMANCE



*Other superminis have a very pronounced "knee" in their curve. That's where their I/O subsystems hit the wall. But not Pyramid. Thanks to our distributed processor architecture, we deliver crowd-pleasing performance. For as little as 2/3 the cost of our competitors' systems.*

Smooth data base management requires high *aggregate* throughput. So you need MIPS, but you also need performance from every other part of your system, too. And that's why Pyramid comes in first.

Our main power plant is the Pyramid 98x ISOPROCESSOR™ system. With its two symmetrical 32-bit processors, it out-runs both uni- and multi-processor-based systems. Our optimizing compilers kick in to boost performance even higher. And they're boosted even more by our RISC-based architecture.

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And our XTEND™ bus is the ultimate in handling. With an advanced cacheing scheme and a message-based, 40 Mb bandwidth, it's no wonder.

But performance isn't the only thing we offer. There's comfort, too.

Yours.

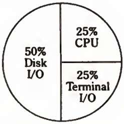
We have strong relationships with every major relational data base manufacturer. So not only will you have a choice of what to run, you'll get support from both us and them. No matter who "them" is.

And since Pyramid systems are open systems, built on widely-supported industry standards, we can give you more different ways to go. Without locking you in. Or locking your other suppliers out. Chances are, they support the same standards. Like UNIX,* for instance.

It's that wide openness that'll have everybody cheering, including you, because a Pyramid can give more people more data base access. From individual users on pc's, workstations or terminals, to departmental micros and super-minis, to mainframes running batch, transaction processing, or scientific applications.

DBMS PROCESSING REQUIREMENTS

*While raw MIPS are important to a data base system's performance, the system still spends most of its time on terminal and disk I/O. That's why we use multiple distributed processors. They put the computing power where you need it. So you're not sitting there spinning your wheels.*



A Pyramid can run with all of them.

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PYRAMID TECHNOLOGY

The Shape of Performance.

Pyramid Power

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# Keeping ears to the ground

From page 45

compatible product lines in the middle range.

Based on what William O. Grabe, IBM vice-president and assistant group executive for the Information Systems and Product Group, told consultants at a May conference in Palm Springs, Calif., one thing seems clear: The architectures of the System/36 and 38 are moving together while moving away from the 370 family. What Grabe said indicates that analysts were off base when they predicted the 370-based 4361 would be merged with the System/36 or 38 or that the System/38 would be driven into the 370 world.

"The announcements we have made and continue to make are growing the System/36 and System/38 together," said Grabe, noting that IBM plans to merge the best features of both systems — the relational data base and programming strengths of the System/38 and what he considers the "low cost, ease of use" of the System/36.

### Lumps systems together

He lumps the systems together in the distributed system, departmental system and personal computer controller markets. One should not be surprised to see either a statement of direction on the future of the systems this week or at least product announcements that indicate where the products are heading.

Note that Grabe stops short of saying there will be a common hardware and software system for the System/36 and 38 and that he says there are enhancements coming for each.

It appears that neither system is ready to die. However, it also is interesting that he refers to the 370 systems as "the other flagship of our intermediate systems strategy."

Grabe says IBM is taking steps to address the shortcomings customers cite in the 370 family, which in this case includes the 4361 and the lower end of the 4381 line.

One complaint he says is in the process of being addressed is the need for a lower entry point. That promise indicates that we finally may see the Micro370 or desktop 4300 that has long been rumored, even if that product is many months away.

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ITT PERSONAL COMPUTERS

BECAUSE TIME IS THE ULTIMATE BOTTOM LINE.

# Fujitsu drives out, controller improved

By David Bright

SAN JOSE, Calif. — Fujitsu America, Inc. recently introduced two high-performance hard disk drives and improvements to its SCSI Intelligent Disk Controller. The three products are scheduled to be shown at the National Computer Conference in Las Vegas this week.

The new drives are the 10½-in. M2360A Eagle and the 8-in. M2333P. The Eagle uses a parallel transfer method to provide fast data transfer and large storage capacity.

With a 12.29M byte/sec. transfer rate, an 18-msec positioning time and a 689M-byte capacity, the Eagle is intended for real-time applications such as medical imaging and seismic analysis. The drive offers a 33% increase in the transfer rate and a 45% capacity increase over Fujitsu's earlier M2350A drive.

The Eagle drive is priced at $19,000 in OEM quantities.

The 8-in. M2333P features a 337M-byte capacity, a 20-msec positioning time and an embedded IPI-2 interface, which is compatible with the latest ANSI X3T9.3 specifications. Its price is $4,995 in OEM quantities. Both drives should be available in the fourth quarter.

Conforming to the small computer systems interface specifications, the enhanced SCSI Intelligent Disk Controller works with Fujitsu's M2333KS 337M-byte 8-in. drive and the M2361B 689M-byte 10½-in. drive. Newly incorporated into the controller are the common command set for multiple device compatibility, a 16K-byte buffer and differential drivers.

Available in July, the con-

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# Spencer fights IBM 'bunch'

From page 45

vendors started to see IBM reach its potential.

"The power wasn't recognizable before then; but when they made those huge factory investments, they said, 'We're going to compete with the Japanese,' and the government permitted them to go after new market share without fear of antitrust reprisal. That's when the name of the game changed, and that's the point at which we had to redirect our own strategies. And that is when we did," Spencer says.

Mainframe revenue growth will come from existing customers, Spencer maintains. "The needs for those customers to add power and performance are there. What is very difficult is to attract new-name customers. Because of the customer's investment in software, it is very difficult to persuade an IBM user to switch to Honeywell, and IBM has to fight every time they want one of our users to switch to their operating system. So the growth in that market is not from new names. It's from expansion of existing systems.

"The growth in new names comes from the manufacturing business, the integrated building business and the integrated office business because we are getting into new, expanding and rapidly growing markets where the marketplace hasn't been picked over and defined."

Honeywell, which now acquires many of its mainframe and intermediate systems from NEC, NCR and Groupe Bull, is scheduled to announce later this year or in early 1987 a mainframe built at its Phoenix facilities, which produce the DPS 8 and DPS 88 processors, Spencer says. He claims that the new system will carry Honeywell into the 1990s.

He says of the joint agreements, "It is very difficult to compete costwise with IBM, so if we have Bull and NEC using similar architectures, let's go where we can get the hardware at the least cost, the least development cost, the least manufacturing risk and base our growth on the software part." He reports that Honeywell would consider more joint agreements but none are pending.

At the mid-range level, Honeywell announced its DPS 6 Plus and an integrated office system two weeks ago. The company also outlined plans to use the DPS 6 Plus technology, as well as various network tools, to link the office, data center and manufacturing and controls segments. Spencer says that reaching all of those markets within a user organization requires a coordinated sales and support approach.

He says, "The end user has to have something that is friendly and he can understand. But you are still going to have to sell the MIS people. You really have to work at both levels. I don't see that you can concentrate on one or the other because the MIS department is getting involved in the selection of the vendors, the creation of the list of vendors who qualify and so on. So rather than concentrating on one or the other, rather than sell just to the MIS manager, which used to be, we are adding that we are going to sell to the departmental user. The same thing in the factory. If you are selling factory data processing, work center controllers and things like that, you better get the guy on the shop floor who is going to use it to say, 'Yes, I want that.' "

Spencer observes that the June 3 announcement "sets the standard for what is going to happen in the office end of things." He notes, "There will be a lot of software added, but certainly, the hardware path that was laid out is what is going to happen in the next two or three years."

> *'The end user has to have something that is friendly and he can understand. But you are still going to have to sell the MIS people.'*
>
> — **Edson W. Spencer, Honeywell, Inc.**

Those announcements relate in part to how Honeywell deals with IBM, according to Spencer, who says, "When we were building our base in the 1970s, it was the proprietary operating system that we sold because it had different features from IBM, and that is how we competed. But today you have to recognize that IBM is there, and you can't run the IBM operating system on a Honeywell machine, but we have to interface with it through the Systems Network Architecture network and be able to access data bases."

He also notes that in the inflationary years of the 1970s, firms could make poor investments in new ventures and absorb the losses in price increases, which the business environment does not allow in the 1980s. As a result, Honeywell began a two-year study of the company's strategy in 1983, with Honeywell's "younger, brighter people" recommending that unprofitable ventures be eliminated. Typical of those ventures was the Dallas-based communications network division, which recently was sold to a venture capital group.

Looking at his own future, the 60-year-old Spencer says he doesn't face mandatory retirement until age 65 and that he plans "many years of hard work." He notes that the May appointment of Vice-Chairman James Renier as chief operating offi-

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A Fresno (CA) hospital uses DataLynx to bring nine DEC VT-100 terminals on line with a BSC host 200 miles away at Blue Cross offices in Los Angeles.

The hospital transfers confidential patient and medicare data to Blue Cross using inexpensive async modems. Administrative productivity is increased through better patient account control and cash flow problems are solved with faster insurance compensation payments.

3287 SPOKEN HERE

InterLynx/3287 attaches virtually any low cost ASCII printer anyplace you can plug in a 3287, allowing a major department store to access their IBM 4381 with a Texas Instruments 850. This provides an efficient and inexpensive method of printing bridal registry service announcements. The credit department also uses the TI850 for efficient printing of records and reports.

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TruLynx PC software provides fast easy file transfer to IBM host programs through DataLynx Protocol Converters. In one major application company executives update financial planning databases from PC's at home and in the office. In another application source code for large mainframe application programs is transferred to and from PC's for demonstration, test and editing.

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Customers of a restaurant supply house in Denver dial an IBM/36 host through a DataLynx/5251, check inventory levels, current pricing and perform their own order entry.

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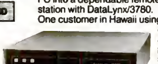
One customer in Hawaii using Prime and Microdata computers for account receivable and payroll data entry, accesses a payroll/service bureau IBM 4300 host with DataLynx/3780.



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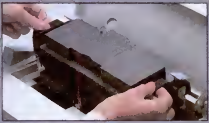

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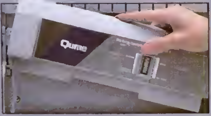

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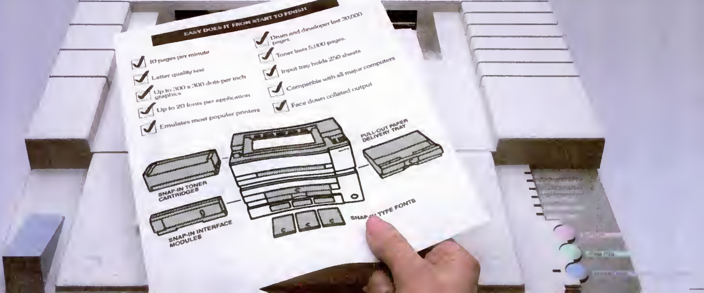
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TYPE FONTS

# Users: Minis for central use only

From page 1

Other results of Datapro's annual minicomputer users survey showed a reversal of a 1985 trend toward greater overall user satisfaction with their systems. More than half of the vendors scored lower satisfaction marks than they did in 1985.

Five of those who scored well were bunched at the front of the field when users rated products on a one-to four-point scale, with four being the best score.

IBM and Tandem Computers, Inc. each scored overall satisfaction ratings of 3.47. They were followed closely by Digital Equipment Corp., Hewlett-Packard Co. and Prime Computer, Inc. with scores of 3.46.

The lowest score, 2.40, was recorded by Modular Computer Systems, Inc. (Modcomp). However, Modcomp was rated by only five users, which is the minimum to be included in the Datapro report. The next lowest scores were posted by Concurrent Computer Corp. at 2.81 and Sperry Corp. with 2.99, which represented a gain over Sperry's 1985 figure of 2.83.

**Monitoring breakdown of systems**

In looking at the general shape of the minicomputer industry, Datapro officials said they will continue to monitor the breakdown between departmental systems and organizational systems.

"It will be interesting to see if those numbers begin to slant more toward departmental usage in the next few years as smaller, office-installable minis are integrated into vendors' product lines and as the manufacturers make available a larger number of micro-to-mini and mini-to-mainframe links," a Datapro official said in a report accompanying the survey results.

Datapro found that, as in 1985, the most common minicomputer uses are accounting, billing, payroll, personnel, order processing, inventory control and purchasing.

The Deiran-based research company also detected a slight gain in user satisfaction with hardware manufacturers' software offerings, although the most common source of applications remains in-house personnel.

RPG was the most popular programming language, apparently because of the heavy response rate from users of IBM's System/38 and 36. Cobol was the second most popular language and the most popular in the non-IBM responses.

**Acquisition plans**

Datapro asked users about their 1986 acquisition plans, and more than 60% said they planned to expand their hardware configurations. Expansion of data communications facilities rated second (45%) on the acquisition list.

The researchers also added what Datapro considered "burgeoning and widely publicized" technologies to the acquisition question. Laser printers landed in fifth place (20%), apparently because of the increased availability of less expensive printers in the 8 to 12 page/min category. Scoring poorly on the same question were optical disks (2%) and Unix (3%).

Seven system families earned what Datapro considers special merit for recording overall satisfaction scores of at least 3.20 and no scores lower than 2.8. Those systems were the DEC VAX and PDP-11, the HP 3000, Tandem's Nonstop, Prime's 50 series, IBM's System/36 and the DG Eclipse MV family.

> *Datapro found that, as in 1985, the most common minicomputer uses are accounting, billing, payroll, personnel, order processing, inventory control and purchasing.*

Datapro officials noted that four of those families are composed largely of 32-bit systems, which indicates an "increased infiltration of the medium-systems market by high-end minicomputers and concomitant user satisfaction with the enhanced performance provided by those more powerful systems."

The Wang Laboratories, Inc. VS family, with a score of 3.72, and the NCR Corp. 9300, with a 3.67 score, were judged the easiest to operate. But Wang, with a 3.30 overall satisfaction rating, saw its scores slip in terms of maintenance, technical support and compatibility of hardware carried over from other systems.

The System/38 and the NCR 9300 tied for first at 3.84, edging out the System/36 at 3.83 for system reliability, while Burroughs Corp.'s B1900 family earned the highest rating for operating systems at 3.73.

Datapro asked users two yes-or-no questions, the first being whether the system did what they had expected, and the second being whether they would recommend the system to another user.

The responses showed 93% of the users thought their systems did what was expected and that 92% would recommend their systems to other users. Concurrent received some of the lowest scores, with 72.73% of its users saying their systems did what they expected and only 60.61% say-

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# sers rate their minicomputers

| vey Item / Manufacturer and Model | Burroughs B 1900 Systems | Concurrent Computer (Perkin-Elmer) Series 3200 | Data General Eclipse MV Family | Digital Equipment PDP-11 Systems | Digital Equipment VAX Systems | Harris H Series | Hewlett Packard HP 1000 Series | Hewlett Packard HP 3000 Series | Honeywell DPS 6 Systems | IBM Series/1 |
|---|---|---|---|---|---|---|---|---|---|---|
| of User Responses | 68 | 33 | 133 | 99 | 285 | 24 | 6 | 283 | 23 | 5 |
| rage Life of System (months) | 42.94 | 43.84 | 35.18 | 55.75 | 42.97 | 51.32 | 70.86 | 39.82 | 42.00 | 42.25 |
| uisition Method (%) | | | | | | | | | | |
| rchase | 60.29 | 93.94 | 80.45 | 80.81 | 78.87 | 75.00 | 87.50 | 65.72 | 73.91 | 100.00 |
| ntal or Lease from Manufacturer | 19.12 | 0.00 | 3.76 | 2.02 | 5.28 | 6.33 | 0.00 | 22.26 | 4.35 | 0.00 |
| ase from Third Party | 17.65 | 6.06 | 14.28 | 15.15 | 15.09 | 12.50 | 12.50 | 11.31 | 21.74 | 0.00 |
| tam Ratings (4.0-1.0) | | | | | | | | | | |
| se of Operation | 3.63 | 2.82 | 3.51 | 3.49 | 3.64 | 3.38 | 3.00 | 3.64 | 3.04 | 3.40 |
| liability of System | 3.57 | 3.39 | 3.66 | 3.61 | 3.67 | 3.46 | 3.50 | 3.78 | 3.09 | 3.80 |
| liability of Peripherals | 3.35 | 3.27 | 3.45 | 3.48 | 3.51 | 3.21 | 3.50 | 3.62 | 3.26 | 3.60 |
| anufacturer's Maintenance Service | | | | | | | | | | |
| esponsiveness | 3.43 | 3.03 | 3.46 | 3.45 | 3.50 | 3.25 | 3.50 | 3.58 | 3.39 | 3.20 |
| ffectiveness | 3.28 | 3.00 | 3.43 | 3.35 | 3.42 | 3.17 | 3.25 | 3.59 | 3.04 | 3.60 |
| anufacturer's Technical Support | | | | | | | | | | |
| roubleshooting | 2.94 | 2.72 | 2.99 | 3.18 | 3.28 | 3.13 | 3.25 | 3.31 | 2.83 | 2.50 |
| ducation | 2.85 | 2.58 | 2.95 | 3.00 | 3.21 | 2.83 | 3.38 | 3.18 | 2.91 | 3.00 |
| ocumentation | 2.58 | 2.52 | 2.85 | 2.96 | 3.28 | 2.88 | 3.00 | 2.92 | 2.96 | 2.60 |
| anufacturer's Software | | | | | | | | | | |
| perating System | 3.73 | 2.71 | 3.47 | 3.41 | 3.65 | 3.04 | 2.68 | 3.56 | 2.87 | 3.00 |
| ompilers & Assemblers | 3.48 | 3.00 | 3.24 | 3.34 | 3.55 | 3.29 | 3.14 | 3.39 | 3.00 | 2.80 |
| pplications Programs | 2.81 | 2.52 | 2.89 | 2.97 | 3.12 | 2.83 | 2.68 | 2.99 | 2.83 | 2.87 |
| se of Programming | 3.26 | 2.90 | 3.18 | 3.27 | 3.42 | 3.21 | 3.00 | 3.29 | 2.86 | 2.25 |
| se of Conversion | 3.08 | 2.57 | 3.18 | 3.00 | 3.33 | 2.86 | 2.57 | 3.30 | 2.71 | 1.87 |
| erall Satisfaction | 3.39 | 2.61 | 3.25 | 3.34 | 3.51 | 3.13 | 3.14 | 3.47 | 2.91 | 2.60 |
| litional Ratings (4.0-1.0) | | | | | | | | | | |
| neliness of Hardware Installation | 3.17 | 3.25 | 3.45 | 3.28 | 3.30 | 3.25 | 3.13 | 3.56 | 3.17 | 3.20 |
| neliness of Software Installation | 2.98 | 2.88 | 3.30 | 3.14 | 3.28 | 3.29 | 2.68 | 3.40 | 3.09 | 3.00 |
| se of Expansion | 2.97 | 3.22 | 3.51 | 3.33 | 3.46 | 3.33 | 3.00 | 3.59 | 3.30 | 3.40 |
| mpatibility of Hardware Carried Over from Other Systems | 3.17 | 2.92 | 2.94 | 3.30 | 3.29 | 2.76 | 2.50 | 3.04 | 2.58 | 1.50 |
| mpatibility of Programs/Data Carried Over from Other Systems | 2.97 | 2.72 | 3.08 | 3.01 | 3.12 | 2.83 | 2.38 | 3.13 | 2.61 | 1.25 |
| ver/Energy Efficiency | 3.02 | 2.80 | 3.10 | 3.01 | 3.14 | 2.96 | 3.00 | 3.26 | 3.13 | 2.80 |
| ductivity Aids Help Keep Programming Costs Low | 2.88 | 2.52 | 2.73 | 2.75 | 3.07 | 2.42 | 2.38 | 3.04 | 2.65 | 1.80 |
| tware Support Delivered by Vendor | 2.71 | 2.38 | 2.83 | 2.70 | 3.02 | 2.86 | 3.14 | 3.09 | 2.42 | 1.80 |
| ping Up with & Implementing Vendor Changes to dware/Software (Very Easy - 4.0, Very ficult - 1.0) | 3.12 | 2.74 | 3.05 | 2.93 | 3.10 | 3.22 | 2.67 | 3.34 | 2.88 | 3.20 |
| he system do what you expected it to do? (%) | | | | | | | | | | |
| | 91.18 | 72.73 | 90.23 | 89.90 | 93.58 | 95.83 | 87.50 | 93.64 | 82.81 | 60.00 |
| | 1.47 | 15.15 | 2.28 | 4.04 | 2.28 | 0.00 | 12.50 | 2.63 | 4.35 | 20.00 |
| cided | 7.35 | 9.09 | 4.51 | 6.06 | 3.77 | 4.17 | 0.00 | 3.16 | 13.04 | 0.00 |
| ld you recommend system to another user? (%) | | | | | | | | | | |
| | 91.18 | 60.81 | 87.22 | 67.88 | 94.34 | 83.33 | 87.50 | 93.99 | 82.81 | 80.00 |
| | 2.94 | 12.12 | 4.51 | 7.07 | 2.28 | 12.50 | 12.50 | 1.77 | 17.39 | 20.00 |
| ecided | 5.88 | 27.27 | 8.02 | 4.04 | 2.28 | 4.17 | 0.00 | 3.69 | 0.00 | 0.00 |

| vey Item / Manufacturer and Model | IBM System 38 | IBM System/38 | Modcomp Classic Systems | NCR I 9050 | NCR 9300 | Prime 50 Series | Sperry System 80 | Tandem NonStop Systems | Wang VS Systems | Other Minicomputers |
|---|---|---|---|---|---|---|---|---|---|---|
| of User Responses | 587 | 347 | 5 | 29 | 63 | 76 | 69 | 30 | 136 | 55 |
| rage Life of System (months) | 31.77 | 50.91 | 53.40 | 46.34 | 32.55 | 32.99 | 44.88 | 50.61 | 39.38 | 52.82 |
| uisition Method (%) | | | | | | | | | | |
| rchase | 67.80 | 65.13 | 100.00 | 82.07 | 80.32 | 80.26 | 34.78 | 88.87 | 83.97 | 70.91 |
| ntal or Lease from Manufacturer | 12.78 | 9.22 | 0.00 | 20.89 | 25.40 | 9.21 | 44.93 | 3.33 | 13.97 | 10.91 |
| ase from Third Party | 16.23 | 25.38 | 0.00 | 17.24 | 12.70 | 7.89 | 20.29 | 10.00 | 20.59 | 14.55 |
| tam Ratings (4.0-1.0) | | | | | | | | | | |
| se of Operation | 3.83 | 3.63 | 2.40 | 3.45 | 3.87 | 3.68 | 3.28 | 3.33 | 3.72 | 3.40 |
| liability of System | 3.83 | 3.84 | 3.20 | 3.54 | 3.84 | 3.72 | 3.30 | 3.87 | 3.42 | 3.61 |
| liability of Peripherals | 3.64 | 3.61 | 2.60 | 3.46 | 3.46 | 3.49 | 3.14 | 3.23 | 3.18 | 3.38 |
| anufacturer's Maintenance Service | | | | | | | | | | |
| esponsiveness | 3.47 | 3.55 | 3.00 | 3.55 | 3.58 | 3.68 | 3.39 | 3.53 | 3.10 | 3.47 |
| ffectiveness | 3.53 | 3.59 | 3.00 | 3.24 | 3.50 | 3.43 | 3.13 | 3.24 | 2.99 | 3.40 |
| anufacturer's Technical Support | | | | | | | | | | |
| roubleshooting | 3.14 | 3.16 | 2.40 | 2.98 | 3.23 | 3.30 | 2.78 | 3.13 | 2.70 | 3.06 |
| ducation | 3.06 | 3.15 | 3.00 | 2.98 | 3.08 | 3.03 | 2.54 | 3.13 | 2.56 | 3.02 |
| ocumentation | 3.11 | 3.14 | 2.20 | 2.54 | 2.68 | 2.93 | 2.41 | 3.10 | 2.49 | 2.61 |
| anufacturer's Software | | | | | | | | | | |
| perating System | 3.53 | 3.71 | 2.20 | 3.34 | 3.41 | 3.61 | 3.10 | 3.47 | 3.29 | 3.31 |
| ompilers & Assemblers | 3.50 | 3.60 | 2.20 | 3.31 | 3.39 | 3.28 | 3.19 | 3.14 | 3.29 | 3.38 |
| pplications Programs | 3.01 | 2.89 | 2.40 | 2.77 | 3.02 | 3.13 | 2.33 | 2.88 | 3.00 | 2.88 |
| se of Programming | 3.31 | 3.59 | 2.00 | 3.21 | 3.30 | 3.49 | 3.01 | 3.10 | 3.85 | 3.06 |
| se of Conversion | 3.24 | 2.78 | 2.00 | 3.03 | 3.37 | 3.32 | 3.00 | 2.93 | 3.23 | 2.89 |
| erall Satisfaction | 3.41 | 3.58 | 2.40 | 3.17 | 3.39 | 3.46 | 2.99 | 3.47 | 3.30 | 3.30 |
| litional Ratings (4.0-1.0) | | | | | | | | | | |
| neliness of Hardware Installation | 3.43 | 3.51 | 3.80 | 3.38 | 3.41 | 3.63 | 3.19 | 3.53 | 3.12 | 3.32 |
| neliness of Software Installation | 3.34 | 3.47 | 3.40 | 3.40 | 3.35 | 3.36 | 3.03 | 3.20 | 2.89 | 3.15 |
| se of Expansion | 3.36 | 3.63 | 2.80 | 3.39 | 3.62 | 3.55 | 3.30 | 3.77 | 3.48 | 3.21 |
| mpatibility of Hardware Carried Over from Other Systems | 3.27 | 2.83 | 3.00 | 3.38 | 3.30 | 3.33 | 2.90 | 2.85 | 2.55 | 2.67 |
| mpatibility of Programs/Data Carried Over from Other Systems | 3.14 | 2.55 | 2.60 | 3.11 | 3.35 | 3.19 | 3.14 | 2.48 | 2.94 | 2.90 |
| ver/Energy Efficiency | 3.28 | 3.20 | 2.80 | 2.84 | 3.58 | 3.32 | 2.97 | 2.89 | 3.09 | 3.17 |
| ductivity Aids Help Keep Programming Costs Low | 3.16 | 3.54 | 2.00 | 2.70 | 2.84 | 3.16 | 2.65 | 2.79 | 3.35 | 2.90 |
| tware Support Delivered by Vendor | 2.94 | 3.00 | 2.00 | 2.62 | 2.95 | 3.10 | 2.54 | 2.90 | 2.57 | 2.72 |
| ping Up with & Implementing Vendor Changes to dware/Software (Very Easy - 4.0, Very ficult - 1.0) | 3.15 | 3.28 | 3.00 | 3.10 | 3.16 | 3.22 | 2.85 | 3.03 | 3.05 | 2.96 |
| he system do what you expected it to do? (%) | | | | | | | | | | |
| | 93.36 | 96.83 | 100.00 | 93.10 | 93.85 | 97.36 | 84.06 | 96.87 | 93.38 | 87.27 |
| | 2.39 | 1.44 | 0.00 | 0.00 | 1.58 | 1.32 | 11.59 | 0.00 | 5.15 | 3.64 |
| cided | 3.75 | 1.73 | 0.00 | 6.90 | 3.17 | 1.32 | 4.35 | 3.33 | 1.47 | 7.27 |
| ld you recommend system to another user? (%) | | | | | | | | | | |
| | 95.74 | 98.56 | 80.00 | 82.76 | 93.85 | 92.11 | 84.06 | 93.33 | 92.65 | 70.91 |
| | 1.19 | 0.56 | 40.00 | 3.45 | 0.00 | 1.32 | 13.04 | 0.00 | 2.94 | 16.36 |
| ecided | 2.90 | 0.86 | 0.00 | 13.79 | 6.35 | 5.28 | 2.90 | 8.87 | 4.41 | 10.91 |

ATAPRO RESEARCH CORPORATION, DELRAN, N.J. 08075 USA

# sers rate their minicomputer vendors

| vey Item \ Manufacturer and Model | Burroughs | Concurrent Computer (Perkin-Elmer) | Data General | Digital Equipment | Harris | Hewlett-Packard | Honeywell | IBM | Modcomp | NCR | Prime | Sperry | Tandem | Wang | Other Minicomputers |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| of User Responses | 88 | 33 | 133 | 364 | 24 | 281 | 23 | 939 | 5 | 92 | 76 | 69 | 30 | 136 | 55 |
| age Life of System (months) | 42.84 | 43.84 | 35.18 | 46.54 | 51.32 | 40.62 | 42.00 | 36.91 | 53.40 | 37.04 | 32.99 | 44.88 | 50.61 | 39.38 | 52.62 |
| uisition Method (%) | | | | | | | | | | | | | | | |
| chase | 60.28 | 93.94 | 80.45 | 79.40 | 75.00 | 66.32 | 73.91 | 66.99 | 100.00 | 60.87 | 80.26 | 34.78 | 86.67 | 63.97 | 70.91 |
| ntal or Lease from Manufacturer | 19.12 | 0.00 | 3.76 | 4.40 | 8.33 | 21.65 | 4.35 | 11.40 | 0.00 | 23.81 | 8.21 | 44.93 | 3.33 | 13.97 | 10.81 |
| se from Third Party | 17.65 | 6.06 | 14.28 | 15.11 | 12.50 | 11.34 | 21.74 | 20.77 | 0.00 | 14.13 | 7.69 | 20.29 | 10.00 | 20.59 | 14.55 |
| em Ratings (4.0-1.0) | | | | | | | | | | | | | | | |
| e of Operation | 3.63 | 2.82 | 3.51 | 3.60 | 3.36 | 3.63 | 3.04 | 3.63 | 2.40 | 3.60 | 3.66 | 3.26 | 3.33 | 3.72 | 3.40 |
| iability of System | 3.57 | 3.39 | 3.86 | 3.65 | 3.48 | 3.75 | 3.09 | 3.63 | 3.20 | 3.75 | 3.72 | 3.30 | 3.67 | 3.42 | 3.61 |
| iability of Peripherals | 3.35 | 3.27 | 3.45 | 3.51 | 3.21 | 3.62 | 3.26 | 3.63 | 2.80 | 3.47 | 3.49 | 3.14 | 3.23 | 3.18 | 3.36 |
| nufacturer's Maintenance Service | | | | | | | | | | | | | | | |
| esponsiveness | 3.43 | 3.03 | 3.48 | 3.49 | 3.25 | 3.56 | 3.39 | 3.50 | 3.00 | 3.56 | 3.68 | 3.39 | 3.53 | 3.10 | 3.47 |
| ffectiveness | 3.28 | 3.00 | 3.43 | 3.40 | 3.17 | 3.56 | 3.04 | 3.55 | 3.00 | 3.42 | 3.43 | 3.13 | 3.24 | 2.99 | 3.40 |
| nufacturer's Technical Support | | | | | | | | | | | | | | | |
| roubleshooting | 2.84 | 2.72 | 2.99 | 3.26 | 3.13 | 3.31 | 2.83 | 3.14 | 2.40 | 3.14 | 3.30 | 2.76 | 3.13 | 2.70 | 3.06 |
| ducation | 2.85 | 2.58 | 2.95 | 3.15 | 2.83 | 3.20 | 2.91 | 3.09 | 3.00 | 3.04 | 3.03 | 2.54 | 3.13 | 2.56 | 3.02 |
| ocumentation | 2.58 | 2.52 | 2.85 | 3.20 | 2.88 | 2.92 | 2.86 | 3.12 | 2.20 | 2.63 | 2.93 | 2.41 | 3.10 | 2.49 | 2.81 |
| nufacturer's Software | | | | | | | | | | | | | | | |
| perating System | 3.73 | 2.71 | 3.47 | 3.59 | 3.04 | 3.54 | 2.67 | 3.59 | 2.20 | 3.39 | 3.61 | 3.10 | 3.47 | 3.29 | 3.31 |
| ompilers & Assemblers | 3.48 | 3.00 | 3.24 | 3.49 | 3.29 | 3.38 | 3.00 | 3.53 | 2.20 | 3.36 | 3.26 | 3.19 | 3.14 | 3.29 | 3.36 |
| pplications Programs | 2.61 | 2.52 | 2.89 | 3.09 | 2.63 | 2.98 | 2.63 | 2.96 | 2.40 | 2.94 | 3.13 | 2.33 | 2.88 | 3.00 | 2.88 |
| e of Programming | 3.26 | 2.90 | 3.16 | 3.36 | 3.21 | 3.28 | 2.66 | 3.41 | 2.00 | 3.27 | 3.49 | 3.01 | 3.10 | 3.65 | 3.06 |
| e of Conversion | 3.08 | 2.57 | 3.16 | 3.25 | 2.88 | 3.26 | 2.71 | 3.06 | 2.00 | 3.26 | 3.32 | 3.00 | 2.83 | 3.23 | 2.88 |
| erall Satisfaction | 3.39 | 2.61 | 3.25 | 3.46 | 3.13 | 3.46 | 2.91 | 3.47 | 2.40 | 3.32 | 3.46 | 2.89 | 3.47 | 3.30 | 3.30 |
| itional Ratings (4.0-1.0) | | | | | | | | | | | | | | | |
| naliness of Hardware Installation | 3.17 | 3.25 | 3.45 | 3.28 | 3.25 | 3.55 | 3.17 | 3.46 | 3.60 | 3.40 | 3.63 | 3.19 | 3.53 | 3.12 | 3.32 |
| neliness of Software Installation | 2.86 | 2.66 | 3.30 | 3.24 | 3.28 | 3.38 | 3.09 | 3.36 | 3.40 | 3.37 | 3.36 | 3.03 | 3.20 | 2.89 | 3.15 |
| e of Expansion | 2.87 | 3.22 | 3.51 | 3.44 | 3.33 | 3.56 | 3.30 | 3.48 | 2.80 | 3.55 | 3.55 | 3.30 | 3.77 | 3.48 | 3.21 |
| mpatibility of Hardware Carried Over from Other ystems | 3.17 | 2.92 | 2.94 | 3.29 | 2.78 | 3.03 | 2.56 | 3.10 | 3.00 | 3.32 | 3.33 | 2.90 | 2.65 | 2.55 | 2.87 |
| mpatibility of Programs/Data Carried Over from ther Systems | 2.97 | 2.72 | 3.06 | 3.09 | 2.83 | 3.11 | 2.81 | 2.91 | 2.60 | 3.27 | 3.19 | 3.14 | 2.46 | 2.94 | 2.90 |
| wer/Energy Efficiency | 3.02 | 2.80 | 3.10 | 3.10 | 2.96 | 3.26 | 3.13 | 3.25 | 2.80 | 3.36 | 3.32 | 2.97 | 2.89 | 3.09 | 3.17 |
| ductivity Aids Help Keep Programming Costs Low | 2.68 | 2.52 | 2.73 | 2.96 | 2.42 | 3.02 | 2.65 | 3.31 | 2.00 | 2.80 | 3.16 | 2.85 | 2.78 | 3.35 | 2.90 |
| tware Support Delivered by Vendor | 2.71 | 2.39 | 2.63 | 2.94 | 2.88 | 3.09 | 2.42 | 2.96 | 2.00 | 2.91 | 3.10 | 2.54 | 2.90 | 2.57 | 2.72 |
| eping Up with & Implementing Vendor Changes to rdware/Software (Very Easy=4.0, Very fficult=1.0) | 3.12 | 2.74 | 3.05 | 3.06 | 3.22 | 3.32 | 2.66 | 3.20 | 3.00 | 3.14 | 3.22 | 2.85 | 3.03 | 3.05 | 2.98 |
| the system do what you expected it to do? (%) | | | | | | | | | | | | | | | |
| s | 91.18 | 72.73 | 90.23 | 92.58 | 95.83 | 93.47 | 82.61 | 94.46 | 100.00 | 93.48 | 97.38 | 64.06 | 96.67 | 93.38 | 87.27 |
| | 1.47 | 15.15 | 2.26 | 2.75 | 0.00 | 3.09 | 4.35 | 2.13 | 0.00 | 1.09 | 1.32 | 11.59 | 0.00 | 5.15 | 3.64 |
| decided | 7.35 | 9.09 | 4.51 | 4.40 | 4.17 | 3.09 | 13.04 | 2.98 | 0.00 | 4.35 | 1.32 | 4.35 | 3.33 | 1.47 | 7.27 |
| uld you recommend system to another user? (%) | | | | | | | | | | | | | | | |
| s | 91.18 | 60.61 | 87.22 | 92.56 | 83.33 | 93.61 | 82.61 | 96.59 | 60.00 | 90.22 | 92.11 | 64.06 | 83.33 | 92.65 | 70.91 |
| | 2.94 | 12.12 | 4.51 | 3.57 | 12.50 | 2.06 | 17.38 | 1.06 | 40.00 | 1.08 | 1.32 | 13.04 | 0.00 | 2.94 | 16.36 |
| decided | 5.88 | 27.27 | 6.02 | 2.75 | 4.17 | 3.76 | 0.00 | 2.13 | 0.00 | 8.70 | 5.26 | 2.90 | 6.67 | 4.41 | 10.91 |

DATAPRO RESEARCH CORPORATION. DELRAN, N.J. 08075 USA

# Executive Roundtable

Avon's Frank Giannantonio

Empire Blue Cross/Blue Shield's Geri Riegger

New York Life's Michael McLaughlin

CW PHOTOS BY P. CHARLES LADOUCEUR

Saks Fifth Avenue's Stewart Neill

## The Roundtable

*At the halfway point of 1986, MIS executives face old questions yet unanswered — as well as new challenges for the future. To help identify these concerns,* Computerworld *invited five MIS executives of leading retail and service organizations to discuss the state of information systems within their companies. They talked candidly about such challenges as managing vendors, padding the corporate bottom line and venturing into telecommunications.*

*Though the five represent widely differing industries, the two-hour discussion, moderated by Senior Editor Glenn Rifkin, revealed surprisingly similar needs.*

Smith Barney's Leonard Carlson

# MIS today: Managing to competitive advantage

**Are the issues you face midway through the 1980s mostly technical or administrative?**

***McLaughlin:*** It's a combination. We're an old-line insurance company that was doing quite well as an insurance company. About five years ago, the world began to change around us, and we had to change quickly if we wanted to play in the game. So we're in the midst of rearchitecting our DP structure to move from a policy base to a client base. We're building a system that will enable us to deal with all of our policyholders, not only as individuals, but as a resource base that is somewhat untapped today.

That's a massive technological problem, but also it's an administrative problem in the sense that the company's culture has to be changed from that of an administrative insurance company to a financial services organization, which requires a totally different perspective.

***Giannantonio:*** The single biggest issue is the great demand for information over the last 18 months. In terms of Avon, there has been the need to expand that information for our management personnel to penetrate our markets better. Therefore the demands on the MIS function have grown considerably. It is not just to respond to ad hoc requests, but a total integrated approach toward information, where you need to supply to marketing manufacturing and financial information which had never been asked for in the past.

This information need is driving us to upgrade our systems infrastructure. As a consequence, we have a host of large major projects, moving into a more centralized processing environment.

**You really are implementing these changes and not just talking about them anymore?**

***Giannantonio:*** The information revolution is taking place, and many companies have used it for their competitive advantage and spawned new industries out of it. That information revolution is starting for us, and we have to be in a position to manage it effectively.

***Carlson:*** I consider it fortunate that we're at a juncture where we can start grappling with both hands on technical issues, for which we are ultimately getting paid, rather than having to [illegible]

# Managing MIS to competitive advantage

**Continued from previous page**
ing the appropriate staffing and infrastructure with which to grapple and manage technology.

If you happen to be undesirably understaffed and have people who are incapable of dealing with a lot of the emerging technologies that have substantially made obsolete the systems in place at a securities firm before, then what you have to do is play catch-up ball and be able to live with what are otherwise inadequate systems.

Fortunately, I look forward to 1986 as substantially a year of managing large projects and revamping parts of our securities firm to provide various types of composite information services to supplant the individual point-to-point market data services we've been receiving in the past.

So 1986 for us is a little bit of a plum pudding. We get to take a look at fault-tolerant composite information systems, local-area networking, greater levels of end-user computing and time sharing.

***Neill:*** The main considerations from my perspective relate to the same area — that is, how to make our systems more flexible, more readily modifiable and be able to create systems more rapidly in order to respond to a much a greater demand.

In 1985, my requests from users doubled over any previous year. And that was not because of some change in the company. It was because we had done enough things for enough people that there was a critical mass of computer literacy.

My requests did not come from people I'd done the least for but from people I'd done the most for, because they were the most conscious of what other possibilities there were. It has made being able to do things more quickly and change them more rapidly more important than before. In addition, since we have put most of the traditional base sysetms in place, it has become more important for us to be in synch with a more global corporate strategy, using information to a competitive advantage.

For all the talk about it, I don't see decentralization as an issue for us. I see greater centralization, because everybody wants all the information. It is dispersed — we have a network to everywhere in the world — but though we have a lot of personal computers, they are doing stand-alone things.

***Riegger:*** I'm surprised by how similar our answers are, but I guess that means we're all correct.

While we are in the business of managing computer technology, I don't find most of my problems or issues are related to technology. They are more administrative or managerial.

My two main issues are No. 1, business in an effective manner and No. 2, once you've tried to do that, to actually get the productivity you need to deliver the products that you've sold to your corporation.

MIS tends to encourage stressing the technology. Sometimes technology is viewed as an end in itself.

I spend quite a bit of time trying to make that transition from just technology for its own sake to choosing the technologies that are most appropriate for the business goals of the corporation.

On the other side, corporate or general business management needs to understand more fully how MIS could be effectively used as a competitive weapon.

We're in a business that is changing. We're in the business, as you all are, of trying to become more competitive. That results in a great number of demands on MIS.

How does MIS respond to that challenge? It is difficult to find people who can mesh the technology with the business goals. Skills are still somewhat in short supply, even though it's better than 20 years ago.

Development is a difficult, complex and brain-intensive business. It is amorphous and unstructured, and therefore, bringing off a product that is really going to satisfy the user's requirements is still a challenge.

> **'I consider it fortunate that we're at a juncture where we can start grappling with both hands on technical issues, for which we are ultimately getting paid, rather than having to worry about not having the appropriate staffing and infrastructure with which to grapple and manage technology.'**
>
> — Smith Barney's Leonard Carlson

## Using information systems for competitive advantage

**Using information systems for competitive advantage seems to be common across your five different industries. Has management said to you, "Do it"?**

***Giannantonio:*** Everyone thinks of computers when they think of information and competitive advantage, but it's really not only computers. There's factory automation and a variety of other types of automation.

There's a lot of new technology out there, but all of it just doesn't fit into your company's goals. Bringing it together and giving your company that edge — in terms of allowing you to do things a lot more efficiently, lower your product costs, lower your service costs — is a way in which the MIS function can provide that capability.

Over the last two years, the MIS community has been inundated with so many new tools and so many different ways to effectively go after a business solution, that the merging of the technologies between the data processing, telecommunications and the office automation is now incredibly — you do a traditional MIS systems development solution or look at alternatives? Our end users are very sophisticated in terms of understanding the applications that are available on PCs. And our role is to facilitate that, bring that information together, otherwise you get stand-alone solutions, and it just doesn't all fit together. We probably won't see the end result of all this integration for about five years.

***Carlson:*** In the securities industry, it has taken a little bit different bent. Historically, MIS has concentrated on efficiency — to be able to produce a certain amount of fixed output at lesser and lesser costs.

With the advent of end-user computing, the emphasis is on product differentation. In certain instances in our business, product differentiation has advanced to such a sophisticated level that if you do not have some baseline of sophistication, you're not even playing the game.

A case in point is mortgage-backed securities. It's a relatively new area for the securities business, perhaps only about 5 years old. And in order to be able to play that game, Smith Barney has to have dedicated end-user computing resources. In particular, we have to be able to structure these relatively complex mortgage transactions by playing an awful lot of "what-if" games. The amount of work that is done by the end-user computing group is very intense and tends to be repetitive. Without the computing support, they could not even be in the business.

So there's definitely been a translation at Smith Barney over the last few years from basic computer operations to a more advanced type of business structuring using PCs and other computer resources.

## MIS spending and its effect on the industry slump

**Every MIS department is facing the mandate to give the company a competitive edge. But vendors are experiencing a serious computer industry slump, to some degree because you folks have stopped buying and are simply evaluating what you've already bought.**

***McLaughlin:*** No, we have not stopped buying. We're not buying as much or as fast as IBM would like us to — and we're an IBM shop — but we're continuing to buy. Our budget has not been sliced. It hasn't grown as fast as it did for a while, but we like to think that is because we are being more efficient and cost-conscious.

The main project we are involved in is data base oriented. So it is going to be hardware intensive. If anything, our expenditures for mainframes — the IBM 3090 line — will continue to grow.

We're also committed to end-user

**Michael McLaughlin**
*New York Life Insurance Co.*

Michael McLaughlin is senior vice-president in charge of information systems and services for New York Life Insurance Co., based in New York.

A lawyer by training, McLaughlin joined New York Life's legal department in 1968. In 1978, he was elected a vice-president and transferred to personnel. In 1981, in an exchange of jobs under a management development program, he was given the responsibility of supervising marketing's Greater New York region. He attained his current position when the information systems and services department was created in 1984.

New York Life is 141 years old and the fifth largest insurance company in the country with $31.7 billion in assets. It is a supplier of consumer and institutional investment services and of group and individual life and health insurance.

grow. We're in the process of substituting PCs for terminals with all of our programmers so they will have PCs as programmer workstations.

***Riegger:*** We have not seen a tapering off and maybe it's related to the business cycle. Some years ago, we had some retrenchment because we had a focus at that time on reducing our costs — again for competitive reasons — and that did affect DP also.

We're in a period of growth now and trying to expand, trying to add new product lines. We've recently segmented the business in a different way, so in fact, we are seeing substantial growth in terms of the hardware budget — we're capitalizing some labor-intensive areas — as well as growth in the development budget, because we've got so much new product development going on. DP development is a critical portion of that, so we are seeing very substantial increases.

***Giannantonio:*** We parallel what Mike [McLaughlin] and Geri [Riegger] just said. We're capitalizing labor-intensive projects. Many of our new systems, especially the large systems, are data base oriented and hardware intensive. And we are going after end-user tools. One of our strategies as it relates to PCs has been that the PC will be our universal workstation. So, be it for the programmer or the management person, that workstation would be a PC integrated throughout the environment.

# The roundtable participants

**Geri Riegger**
*Empire Blue Cross/ Blue Shield*

Geri Riegger is vice-president of electronic data processing for Empire Blue Cross/Blue Shield and manages one of the largest computer operations in New York.

Under her supervision is the central data center, housing five IBM 3090 and 3081 mainframes, which process 2,000 jobs and 500,000 on-line transactions daily.

Riegger began her career in 1961 with IBM as a systems engineer. After eight years, she moved to Manufacturers Hanover Trust Co. She served as a White House Fellow in 1974 before returning for another stint with IBM. Prior to joining Empire Blue Cross/Blue Shield in 1982, Riegger was a vice-president at the Federal Reserve Bank of New York.

Empire Blue Cross/Blue Shield is the largest, private nonprofit health insurance company in the nation, serving more than 10 million people in the state of New York.

**Leonard Carlson**
*Smith Barney, Harris Upham & Co.*

Leonard Carlson is vice-president in charge of global technology planning within the information services division of Smith Barney, Harris Upham & Co. He reviews all new technology and evaluates its pertinence to Smith Barney's business.

Prior to his current job, Carlson served as manager of computer resources for corporate finance at Smith Barney. He came to the firm from Commercial Investment Trust Corp., where he worked as a sales manager.

Carlson also held positions at E. F. Hutton & Co. and Kidder, Peabody & Co. after gaining both a bachelor's degree and an MBA in finance from Fordham University in New York.

Smith Barney, headquartered in New York, is a leading investment banking and brokerage firm serving the domestic and international debt and equities markets.

**Frank Giannantonio**
*Avon Products, Inc.*

When Avon called 12 years ago, Frank Giannantonio answered. As director of information services planning and technology for Avon Products, Inc., Giannantonio heads data resource management, the information center and all MIS functions in Latin American, Asia and Europe.

Giannantonio coordinates strategic planning with corporate headquarters and explores new technology for the company.

As head of the information center, he also has responsibility for end-user computing, personal computers and office automation.

Prior to joining Avon, Giannantonio worked as a consultant for a small MIS consulting firm.

Avon is the world's leading manufacturer and distributor of cosmetics, fragrances and fashion jewelry. Its products are sold by nearly 1.4 million representatives in more than 30 countries.

**Stewart Neill**
*Saks Fifth Avenue*

Stewart Neill, vice-president of MIS, joined Saks Fifth Avenue in 1978 as director of systems and programming.

He assumed responsibility for all data processing functions within the company in 1981.

Prior to joining Saks Fifth Avenue, Neill worked for 10 years as a systems engineer for IBM's New York retail office and also served as an IBM consultant to several major retailers in the New York area.

In the past year, Neill hired a director of electronic data processing, which now frees him to spend more time on strategic planning for development, operations, technical services, office automation and information systems.

Headquartered in New York, Saks Fifth Avenue is a fashion-oriented specialty store chain with 40 stores nationwide.

specifically because we intend to spend money on hardware. I'm getting a 3090 next year.

Next year I will spend the most we've ever spent in history. All these things are going to land in one year and that obviously is going to be a problem because the capital lump is going to get unusually big. But that's really a reaction to the timing of IBM products.

## Organization: Centralized vs. decentralized

**I'm sure vendors will be happy to hear that generally you expect to be buying more hardware. But then why is the computer industry so slow right now?**

***Riegger:*** Maybe it's in certain industries that are retrenching.

***Neill:*** There's another aspect that I see. Within two years, I'm not sure what my expansion might be, because the things that we are looking at doing will put every piece of information — down to every single transaction in the entire corporation for a three-year history — on-line.

What's left to put up after that? In terms of disk space and peripherals, the growth of that base is just not dramatic.

But I see potentially — and I could end up like Jeanne Dixon on this prediction — not very far down the road, having all the information available, and it simply becomes a is very real. In fact, I think some of the strategies we'll have to consider over the next few years address this great demand on information: Do we centralize all that information? Or do we do it via distributed networks and place a heavier emphasis on telecom? The latter may really come about.

Your buying decision is affected by which way you will go.

***Neill:*** I see us remaining heavily centralized. It may be more intelligent to play with data locally in some cases. But that data will all have to be pulled centrally.

***Riegger:*** Basically, there isn't one solution for MIS. I think MIS' organization ought to reflect the corporate organization. If the corporate organization is decentralized, then MIS in general should be decentralized also, although you may have some common components like networks that cut across all those parts of the business.

***McLaughlin:*** The centralization of data but the decentralization of access is what we're trying to do.

We're trying to create a system in which the agent from his office in as remote a location as we have will have direct access to mainframe data that relates to his client and will be able to deal with that data in a meaningful way. We're not there yet, but we're on our way.

***Riegger:*** We're moving from centralization to a more decentralized or segmented approach for that reason. network in many senses crosses those segment lines. So that is a common component. You can then decentralize the processing.

Basically we're trying to structure it so that the processing can move where ever it needs to move, depending on the needs of the business.

But the point is that the business ought to drive how MIS is structured, not some theoretical idea of "Is one better than the other?" Depending on your situation, it may be either centralized, decentralized or some mesh of the two.

## The challenge of cost-justification

**Are you getting what you need from your companies in terms of the MIS budget?**

***Giannantonio:*** There's never been a carte blanche. Everything has to be justified appropriately. It depends on whether your business is growing, stagnating or declining. With your cost expenditure programs in place, it really depends on what your company is doing.

***McLaughlin:*** We go through an annual budget process, and we start with an idea in mind that the total company budget shall not be larger than X. And then people do their internal negotiating.

But very often before the budget is finalized, everyone is told to do overall reducing.

**Do you feel constrained by your budgets, that the money is only half of what you need?**

***McLaughlin:*** No, we are well in the ballpark of what we need.

***Neill:*** I haven't had problems. Our budget has not grown faster than the company but faster than most other internal budgets.

I'm constantly doing things that are cost-justified — straight up and down in hard dollars — that save money for other people. It goes into my budget and then gets charged back to them because I'm zero-based.

But when you look at my budget, it's big. Now those other people who got savings from me, when they go negotiate their budgets, they never go in and say, "I saved $500,000 here." They say, "I want a half-percent increase." But they got $500,000 out of me that could have been a reduction.

So that gets tricky, because all the things I do save money predominantly outside my department and increase my budget.

***Giannantonio:*** That's a good point. In fact, I think what we have to do for each of our companies is show our senior management that at times an investment in MIS is necessary so you can propagate savings throughout the business. And look at that as an investment as opposed to a fixed cost, because those opportunities exist with MIS to save money in other departments.

***Riegger:*** MIS really has two bud-

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Continued from page 59
of your transactions costs over time. But there is also the investment part, which is in the development budget. And that ought to be evaluated on the basis of return on investment. Are you saving money elsewhere in the corporation? I just don't know how many corporations have a formal method of evaluating that.

**Neill:** In most of our areas we do that when we begin a project. And it's followed up to see that those savings were achieved. But then it tends to be forgotten about.

**Riegger:** If you are doing that much, that's good.

**Neill:** My development costs are a very small part of my budget. I have so many systems out there that my hardware is overwhelmingly dedicated toward production. My other equipment is even more so — 99% of the peripherals out there relate to production. And then I've got a fair amount of my staff doing maintenance work, and I'm below the industry average from what I see. But development is still a small piece of the whole.

> *'All the things I do save money predominantly outside my department and increase my budget.'*
> — Saks' Stewart Neill

**Giannantonio:** You are certainly not alone. As you build more systems, it requires more day-to-day support, and that area of your budget has to grow. And the problem is if you have a fixed budget with minimum growth, then you are going to erode the new development functions over to the operational areas. That's where the investment has to be made so your company can see that investment is necessary. Otherwise you can't provide that type of future service.

## Keeping up with growth through development

**Neill:** But I only see 8% to 12% of my budget is in development. I don't feel really constrained. I'm involved in a proposal now to add staff, not because it has been skimpy but because of this surge of requests that occurred. It has created a different backlog situation than I used to have. And I've got to come to terms with that, and the company feels that those requests are legitimate. But it would be inconceivable to me to have 25% of my budget be development.

**Riegger:** I wonder sometimes if we can keep up with the growth because the inventory keeps getting larger. And every time you build a system, you not only incur the cost of doing it for the first time, you incur the cost of maintaining it over time and replenishing it after some period of time. I wonder how we can keep up with this, especially since we are also seeing the requests for entirely new products that are not in our inventory at all.

**Giannantonio:** That is hopefully where technology could support us.

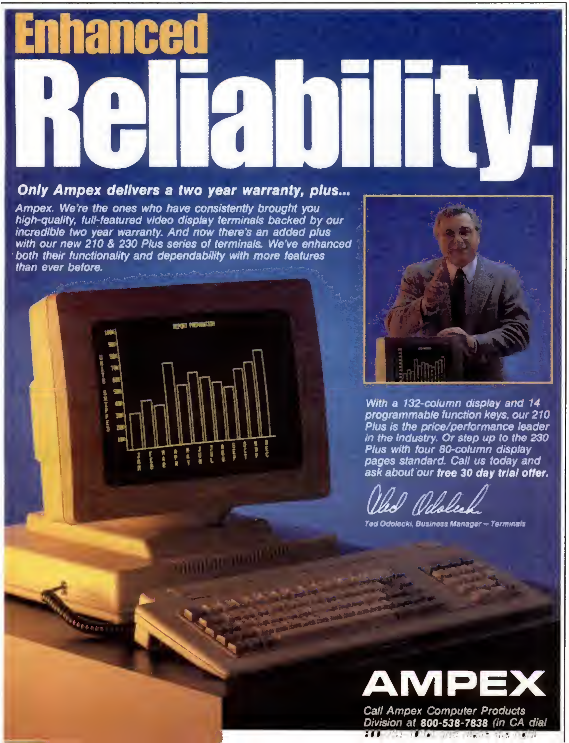
**Riegger:** The hardware has progressed at a faster rate, with orders of magnitude improvement every five years, depending on whether you are talking CPUs, DASD or tape. That has progressed so much more than our ability to address the development problem, which is still rather brain intensive. There have been improvements over the last 20 years, but not in the range of what we've seen in hardware.

**Giannantonio:** What I meant by technology . . . what we're looking at is how do you manage a limited number of resources for development? And the things that are coming on the marketplace, new tools like fourth-generation languages that hopefully are going to improve your programmers' productivity and produce those systems a lot faster, use different techniques to do just that. Because with a small percent of your budget dedicated to development, you just don't have that luxury. That's where I see new tools aiding us. Now, how much or what percent of that increase in productivity will be gained by using those new tools, I couldn't give you a fixed percent.

**Riegger:** True, but does it meet the demand?

**Giannantonio:** I don't know if you can ever meet the demand. The information center concept was introduced many years ago with the thought that it would reduce the proverbial backlog, and people tried to measure their backlog. I don't think you can measure your backlog. Your backlog just grows. It's infinity. The user will keep asking, and he has a lot of needs and demands. So it's always interesting when I hear someone say, "I have a two-year or three-year backlog." I don't know how to measure it.

**Neill:** I find that a very substantial amount of time putting a system together is spent having the user decide what that system truly is. The tools address that a little, but not much. That's the slowest piece of the process, and it's the one that the tools address the least. Users aren't used to thinking in systematic terms; therefore, when you start dealing with them, they may have a manual system and tell you they want to automate that. And that's not even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of the new tools that we have to provide for the user.

The conventional way of developing systems — where the user would come to you with just such a request and we would go back and define it, build it and then implement it — no longer applies. With those users that don't have those analytical capabilities, you have to do other things. So building the systems that way has to change. The system evolves over time as opposed to a fixed calendar.

With the hardware costs coming down, you really don't worry too much about how efficiently it's being built at the time. It grows over time. And you deliver to the end user a system that is very usable and it can be delivered faster.

***Carlson:*** It almost appears that the organization, like an organism, goes through different life cycles, and if you happen to be primitive, if you get some wheels on your cart, that's considered a future. But if you are already used to end-user computing and you have intelligent users, all of a sudden what were not problems in the past have become problems.

One of them happens to be manageability. Very often users become so demanding they don't care what might be a good approach to getting it done.

Something that has emerged at Smith Barney over the last couple of years is that users have become somewhat able to appropriately specify both the data bases and applications that they want. The problem there is you can actually go down the road doing quite a bit of work trying to develop a system, only to find it is no longer adequate. And you may have to start again.

> ***'I don't think you can measure your backlog. Your backlog just grows. It's infinity. The user will keep asking, and he has a lot of needs and demands.'***
>
> — Avon's Frank Giannantonio

So there is a lot of precaution that has to be built into our approach to end-user computing, so that we don't get dragged along by the user only to find that we have to develop the same system twice.

***Riegger:*** We have to put the emphasis on product strategy. MIS should be part of the product strategy development and try to work together with the users to get agreement up front on what the product goals are. That's where I think the main problems are, that we are not necessarily involved and don't necessarily talk the same language when it relates to products.

That's the point we have to get to, the agreement on the strategy of the product part of the cycle. That's what takes the time.

We've all been saying that the tools we've got so far really address the back end of the process, the more routine parts, like coding and testing. We've made progress there, but it's not clear to me that we've made that much progress at the front end of the cycle.

Some of the more traditional ways of doing development according to the project life cycle have still not worked that effectively over time. We still need more work on the front end of the cycle, the part where you are working and designing with the user.

Some people have suggested things like getting the user and MIS together in a room to get clear on objectives and agreements on design — instead of doing requirements for six months, handing them over the wall and having someone go off and design it. Anything you can do to bring the two together and to have common accountability for the product addresses this problem of development taking too long and then after it is done, not meeting specifications.

***Giannantonio:*** Yes, in fact we started doing that a year ago.

***Riegger:*** Have you found that to be effective?

***Giannantonio:*** Yes. Bringing the users together in the business requirements portion of your life cycle — using different types of simple tools — can be effective.

Instead of drafting down the requirements, we used storyboard or displayed thinking, putting 3- by 5-in. file cards on the board. We even videotaped the session. And we'd have a facilitator run the meeting. It may go for three or four days. And you agree on an acceptance criteria at that stage before MIS would go into the computer systems design phase.

***McLaughlin:*** We've used that approach somewhat successfully to the point that for the first time, the ability to go forward with a development project may be affected by the unavailability of users rather than by the unavailability of programming resources.

## Time management: Finding enough hours

**That's an interesting turnabout from what we've heard for so long. What about time management, budgeting your time? What would you do if you had five more hours per week — get out to trade shows, read more magazines?**

***McLaughlin:*** God forbid, read more magazines.

***Giannantonio:*** I can't read anymore.

***McLaughlin:*** I'd get out of my office and talk to people, both my staff and the end users. We've got two data centers, one in New York and one in New Jersey, and we've got about 1,000 people — about 600 pro-

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grammers. I deal with about 25 department heads on a regular basis, but I don't spend a lot of time with them.

"Trapped" is a bad word, because I control my own schedule, but I find myself being trapped in my office or in meetings and not spending a lot of time out on the floor. And I ought to be out on the floor more than I am.

***Giannantonio:*** In covering Latin American, Pacific and European areas, it's quite difficult to really get the input. The MIS people around the world have excellent ideas, and I want to tap that effectively so that I can share that across all Avon locations internationally. It's very difficult. We all have limited resources to manage that.

## Educating senior management about MIS

**Does senior management understand better in 1986 than ever before what your needs are? Or are you still fighting an education battle?**

***McLaughlin:*** Management certainly understands the business need. Because they don't have DP backgrounds, it is very difficult for them to understand what it takes to get it done. They are asked to commit huge amounts of money to create this system, based on a statement that it will do this and this and this. But because of their background, they cannot satisfy themselves in advance that it will, in fact, do this and this. That must be a very difficult position for senior people to be in.

***Carlson:*** That's a good point, because as a practical matter, we have some folks who are eminently capable of evaluating the trends and the business side of the securities business. However, there's definitely a requirement for a stewardship function in the area of technology. Because the assumption is that there is a laundry list of these apparent benefits, but there is no ability to understand whether this vehicle that's being proposed — this unusual combination of software, hardware and people — is going to deliver it; whether, in fact, upon delivery it's already going to be obsolete.

As you offer all these piecemeal benefits, then rises a different ogre, which is integration. And that is a real problem, because what we're discovering is our word processing/office automation function has a life of its own and its own growth rate.

Then there are the computer operations and other data communications capabilities.

The problem is that now you are starting to see the ability of great parts but certainly not the whole thing. And there is a strong desire to be able to integrate various parts and pieces, not all of which you can anticipate in advance.

So the problem starts to become, "Have I implicitly said that I am going to have to revamp large chunks of this down the road, or is there a much more sane approach to trying to be able to manage the life cycles of all these pieces and have them merge somewhere down the road?"

***Giannantonio:*** You bring out a good point. The way senior management views us and the large expenditures on DP really cause MIS people together, and — as Len [Carlson] indicated — integrate it effectively over the long range. So you effectively manage a strategy that is going to lead you somewhere, as opposed to putting various pieces together and then three, four or five years later notice that they don't fit together.

The business planning portion becomes very significant in the 1980s for each of us to do.

***Riegger:*** There is sometimes a problem in overintegration. If you integrate too much, then you are not always able to be responsive, because it does make your projects more complex. So you need some combination of the two. That's why I was stressing that I think data is a point of integration. Networks are a point of integration. It's not clear that processing ought to be a point of integration. You could have it redundant, repeated in different locations. You could move it out and still get the net effect of integration. But I have some concern, especially in systems that cross corporate lines, that it gets extremely complex to have everything integrated in one place. You end up with these long, complicated development efforts.

***Giannantonio:*** You're right. But you have to ask yourself some key questions: What is your PC strategy? How does it fit with your mainframe long-term strategies? Where is it going with OA and your telecommunications strategies? How do they all fit together? If they don't, then what's driving your business will drive you even further apart from your goal.

No. 1, we have to understand where each of our businesses is going and what its needs are. How much integration, as you suggested, is actually needed? It may not be a lot. When you look at your data base strategy, your application development strategy, your PC, OA, productivity tool strategy, are they all fitting together? Because in a large department you could have separate groups go after these, and what happens is they work well but they don't fit together.

***Riegger:*** If integration is meeting the business needs, then fine. But, for example, another buzzword in the industry is voice and data integration. And sometimes we say that and it's a glamorous thing and it's desirable in and of itself. That's not clear to me. I think integration of

Continued on page 67

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# Making the decision: Which 4GL?

*During Computerworld's recent executive roundtable in New York, the discussion turned to fourth-generation languages. Of great concern to the participants, the use of fourth-generation languages presents both confusion and a challenge to those exploring their implementation.*

**Neill:** Is anyone here using a fourth-generation language heavily? Which one and what is your experience with it? That's an evaluation I am heavily into right now, and I am finding it probably the most confusing decision I've made in my whole career.

**Carlson:** It's difficult; it will require a large team effort. You have to make sure everyone is prepared to go through the relatively difficult struggle to evaluate all the different packages and different features.

But ultimately, if you happen to have some good causes to bring in fourth-generation systems, they can simplify development immensely. I'm very much in favor of 4GLs as far as a productivity pop.

At Smith Barney, we brought in a time-sharing system based on the IBM 4341 series, which has now been upgraded to IBM 4381 running VM/CMS. We are very pleased with it. We personally consider it one of the strengths of the IBM line. One of the benefits of VM/CMS is that there is a lot of software that sits on top of it, particularly 4GL stuff.

And for actual applications, which happen to be numerically or computationally bound, we ultimately decided to get Express from Management Decision Systems, Inc. It is a full product line and a robust solution. It also enabled us to integrate with data bases which are key to the securities business and that we manipulate on a regular basis, such as Compustat and pricing.

For the data management or records processing side of our work, we decided to bring in Information Builders, Inc.'s Focus. We found that product to be a tremendous boon, inasmuch as there are lots of data bases that end users want but don't really get. The personal computer is a very inadequate tool for providing data services in terms of data bases.

Working with Express and Focus has permitted us to push tools out to the users and also to be able to respond more quickly to their demands.

**Neill:** But if you go to Focus, then you must use the Focus data base, and you have to take all that data from other data bases and have it in a redundant data base, right?

**Carlson:** Some of it has been migration into other data bases, that's true. But to a fair extent, it has been either data entry based on the business or a series of tapes that we received from vendors. For example, I mentioned Compustat or pricing tapes. We get those on a regular basis and our computer operations people load and mount those tapes.

**Neill:** That is not applicable to my environment at all. I'm more interested in fourth-generation

*'Ramis was the only game in town, and that's why we used it.'*
— New York Life's Michael McLaughlin

you have a tremendous amount of data that you are pulling in from a lot of outside sources, my information is 99% internal and needs to be massaged.

I've ruled out, for example, Focus, Martin Marietta Data Systems' Ramis and D&B Computing Services' Nomad on the basis that they don't work for production data bases well, and also they are mind-bogglingly inefficient. They use five, 10, 20 times more resources than other products.

I've now narrowed it down to Model 204 from Computer Corporation of America and IDMS from Cullinet Software, Inc. And they both have fourth-generation languages that are quite powerful — though not as powerful as Focus for that kind of thing. But they are dramatically more efficient and also more suited to doing true fixed applications.

*'It's worthwhile struggling with the enormity of trying to evaluate a 4GL.'*
— Smith Barney's Leonard Carlson

**Giannantonio:** We've had Express since 1979, and we built marketing and financial decision support systems on it. We basically put it up in production and turned it over to the user. And the users have built God knows how many applications off that.

However, the reason we looked into fourth-generation languages is that we have a development center that looks at productivity tools for our programmers. And we did an evaluation last year and selected Ramis II. We haven't ruled out Ramis II for the entire systems department yet, but in that comparison and during that evaluation, I actually did a pilot in eight days.

**Neill:** But what kind of applications did you do?

**Giannantonio:** It was an application in which ad hoc analysis was required, not a traditional transaction-based, large batch-processing application.

One of the things we're doing now is listing the dos and don'ts of how you would use this fourth-generation language, because you wouldn't use it for all those types of applications.

It's similar to looking at your data base, be it relational or hierarchical, and deciding how to use it and how the fourth-generation language integrates with that data base.

**Neill:** I've been to quite a number of sites with all three — Focus, Ramis, Nomad — and they've generally done two things: Put it on a machine by itself, or suffer with response time so slow that I never saw anything like it before. That seemed to be the nature of the beast.

*'The reason we looked into 4GLs is that we have a development center that looks at productivity tools for our programmers.'*
— Avon's Frank Giannantonio

**McLaughlin:** We're having that problem with Ramis. We have Ramis working with a data base to create reports for our group business, and it's not working. The data base is simply too big.

Ramis was the only game in town, and that's why we used it. But we are struggling to try to find some way to make it work, and we're not having a lot of success.

I think both the vendor and we thought it would work, but it had never been used on a data base the size we used it for. And it didn't work. We're not prepared to go back to square one with

are suited to very large data bases.

**Giannantonio:** That's why, regardless of what your selection is, you should make clear how you intend to use this package and where it should be used in your organization, because it doesn't suit all jobs.

**Carlson:** Unfortunately, you can't summarize it in one statement.

It's worthwhile struggling with the enormity of the task of trying to evaluate a data base management system and trying to evaluate a fourth-generation language for the modeling side.

I would also suggest that you are quite right in differentiating between the Focus and Ramis types of data bases from the IDMS and Software AG of North America, Inc. Adabas types of data bases.

At Smith Barney, for the production in large data bases, indeed, we are totally committed to IDMS, and that's all we will use for those types of data bases. But for those that happen to be smaller in size and more agile and happen to be at the beck and call of users, perhaps for marketing purposes, that's the domain for Focus.

**Neill:** Have you gone into using IDMS/Relational features, since IDMS before IDMS/R was quite inflexible? Now it's reasonably flexible. Have you employed that at Smith Barney?

**Carlson:** We broke up into a series of teams, and we came up with a list of 12 data bases that were targeted for the end-user computing function. We had already made the IDMS commitment for larger data bases.

For the end-user computing side, we set up four teams. One looked into Focus, another, Oracle Corp.'s Oracle, another, IDMS/R and another, Ramis. IDMS/R was still too immature at the time, and we felt that it didn't have all the advantages that Information Builders had in its product.

And we had other types of problems with the other data bases. We had different problems with Ramis, such as performance. We decided not to make the same mistakes some other folks ran into, even though we were impressed with the robustness of Ramis.

Ultimately, you'll find out that you have to do detailed investigation with two or three different products. Look at all the features based on reporting, application building and efficiency and performance.

Ultimately, we started with our own Smith Barney evaluation criteria and painstakingly worked out the detail.

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Continued from page 65

voice and data is appropriate at some points in your network architecture. But it's not clear to me that one ought to integrate it from the beginning all the way out to an end point. That's not necessarily valid for the business at this time.

**Do you find yourself fighting that situation a lot, in which senior management reads something in *Computerworld* or elsewhere and they come to you and say, "Why don't we have this if everybody is talking about it?"**

***Carlson:*** Absolutely. Buzzwords are very dangerous, particularly on Wall Street. Just a few years back, one of our colleagues — not in my firm fortunately — said, "When we look for networks, we look for Ethernet." It's two years later, and now if there's one thing the world wants to look for, it's token ring. I don't know what it's going to be two years from now.

The point is that it can be very infectious and dangerous and there's an assumption, a nagging feeling that management has, that they are going to fall behind if they don't have the latest and the greatest.

What's very important is to make sure you have a technology services group that's potent enough to be on top of these issues. Not just to address it internally, but to actually manage it.

> ***'An important function of MIS is vendor management. Control the vendor rather than the other way around.'***
> — **Empire's Geri Riegger**

A problem definitely arises if you have a weak technology services department that cannot catch up to what its job really is. At that point it probably is valid for the business people to put their fist on the table and demand certain types of services that they are not getting.

But more properly, there should be a technology leadership function that has enough foresight to be able to understand what is hype and what is not. Because if you let your life get driven by your vendors, your budgets will explode, and your business will not be able to function.

## Dealing with the vendors: Who makes the rules?

**What is your relationship with the vendors? How are the rules of purchasing and negotiating changing now in the mid-1980s?**

***Giannantonio:*** What I prefer to do is develop a partnership relationship, where the vendor is not just selling a product to me. He understands my business. And from those products he has to sell, he shows me where those products could fit in to support my business. I may not choose to pick them. But I want him to understand my business before he tries to sell me on the technical advances of some of his products, because there may be something there I never considered. And where I consider a vendor valuable is in showing me an alternative approach to something I never even thought about. As long as the vendor is willing to take the time to learn my business and show me where he could help support that business, I'm very willing to listen.

***Neill:*** I would agree. We're an IBM shop essentially. The principal difficulty I find in my vendor relationship is that some of my IBM equipment is used IBM equipment and that makes them very unhappy. So that's a tricky balance to deal with, because sometimes the life cycle of that gear and the cost of it are so attractive in the third-party market that it is just not sensible not to get it there. But that's where you start getting pressure from the vendor, and that makes it more difficult to have the partnership arrangement Frank [Giannantonio] discussed, which I find valuable but difficult. They want the partnership to mean that you get everything new from them.

***Giannantonio:*** What's right and good for you might not be good for them. You are going to do what's right for your business, not what's right for your vendor. Several vendors sometimes don't see that.

***Riegger:*** An important function of MIS is vendor management. Control the vendor rather than the other way around. If you control them appropriately, they can do good things for you. They can make proposals related to your business. They can save you money.

But there's no question they have to be controlled. The other thing MIS needs to do is sort out the hype from the reality. They do come in with an overly optimistic picture of what can be achieved, and especially if you are the one responsible for implementation, you have to sort that out for your users.

I've been on the marketing side. I spent 10 years in the technical support side of the marketing division of IBM, so I understand what they are trying to do. But, clearly, part of their intent is to present an optimistic picture, because they want you to buy. MIS has to put some reality into that.

**Has the industry slump given you more leverage with the vendor, even with IBM? Are you in a more powerful**

Continued on next page

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**Continued from previous page position now that the vendors are more hungry to sell?**

***McLaughlin:*** I don't think so. We may be different in the sense that we are totally IBM, so we don't shop for products, we negotiate with IBM. But for us, it maybe works a bit the other way. If IBM is experiencing a slump, the sales team assigned to us, about 25 people — I never realized how many IBM people were dedicated totally to us — become more aggressive in selling to us and unhappy if they don't get the business.

They get virtually all our hardware business, but the software business goes where the best place to put it is. And they become even more unhappy if they don't get all of the business, to the point of being more aggressive on what I would think are very small dollar-value items. In the past I would have thought that if we weren't going to go IBM on these small items, it would not have been a particularly significant issue. But today it is significant.

I'd like to ask a question about vendor management. We've adopted a process which allows the IBM team to have direct access to our end users, to the ultimate customer. The frame of reference is that we [MIS] should not be a funnel, a bottleneck, in the sense of imposing our views on the company and on IBM. And by involving the user directly in the process, we get a better free-flowing discussion from which ultimate decisions are made. It all runs through our budget, so we're always involved in the process but not in control.

Conceptually, I agree with it wholeheartedly. On a day-to-day basis, I don't always find it a thrilling situation. I wondered if anyone else has had experience with that process?

***Carlson:*** I'd like to bring up one point here. I have a relatively aggressive stance on vendor management.

First, I'd like to make a broad generalization, even at the expense of being wrong in certain instances. I find that as far as vendors are concerned, on the DP technology side, ultimately you will find in your shop that you are dealing with a lot of pressure. A supplier can pressure you very much, especially if you've achieved certain levels of scale.

Obviously at Smith Barney we have scale in IBM, in AT&T and a few of our data vendor services. And they can pressure you in terms of where you are going to go next and what you can and cannot do. And trying to uplift the organization away from that coerciveness is a very difficult thing to do. It's a people-intensive thing.

In order to do that, you may have to sacrifice your weekends and work late because the vendor is saying, "If you sign up with me, I'll make your life easy. But you can't move away from me." On the other hand, you can have total independence, but you are going to run about twice as hard, twice as fast. And that trade-off is going on all the time.

What I'm trying to do on the technology planning side of things is have us look at other vendors who actually have good, bona fide ideas.

Rather than to just turn around inappropriately and say, "Let me find out what IBM has," I'm finding

> ***'For the first time, the ability to go forward with a development project may be affected by the unavailability of users rather than by the unavailability of programming resources.'***
>
> — New York Life's Michael McLaughlin

tus happen to have. In fact, some of these small companies have better niche solutions and are running harder just to be able to win the business. They can't seem to get it because existing suppliers control us to a great extent.

**Do you find that when you look at smaller vendors, that you are then facing a systems integration problem, where you need a third party or more of your own time to make these things work together?**

***Carlson:*** Absolutely. You are saying, when you go with one vendor, that you are going to be suboptimal in certain areas, because one vendor cannot cover all things very well. The trade-off is that you are willing to vertically integrate. You are going to add more operating leverage to your side of the house by saying, "I'm going to now buy specialty people, those that happen to be expert in a given operating system, whether it be Unix, Digital Equipment Corp.'s VMS, whatever it happens to be." You have to develop the infrastructure to be able to support that. And that is not too appealing. Because what happens is that you are talking an entirely new language and the people who have become adroit at IBM do not look very fondly, even internally in our own company, at the proposal of bringing in a DEC system.

**Are there other vendors, like DEC, that you are looking at hard because IBM, let's say, doesn't solve all your problems?**

***Riegger:*** I think IBM always per-

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## Executive Roundtable

forms a little better when there's a little competition around. The unfortunate part is that in the last few years, they've sort of sewn up the mainframe business. But it is important in the totality of the equipment purchases to try to get some competition in there. And I think competition is coming to the fore. Certainly in communications, it is not a one-vendor business.

**Neill:** I don't see training my people to work with multiple computers, because I'm not a big enough shop. Now at Smith Barney, you probably have many hundreds of programmers. Anytime you are in that situation, you can have a sizable group that's expert in different things. In development, I have 40 people — that's too small to get multiple systems in that environment readily.

The other thing on this whole IBM question — you [Riegger] are apparently an ex-IBM systems engineer. I am also. I spent 10 years with IBM, and I'm fairly familiar with IBM inside. They do apply a lot of pressure. They will go to your top management like that. I do not let them go to my users unless I go with them, because I have plenty of backlog anyway. The users are likely to be more confused by what happens than anything else. And I keep IBM completely away from the users, unless I go to the meeting with them in a structured situation or IBM comes to me with something and it makes sense.

**McLaughlin:** IBM did us a favor. It was a hard lesson, but what we realized was that when they were dealing directly with the users, they were doing a job we should have been doing. They were going to the users and saying not, "We're here to sell you PCs," per se, but "We're here to talk to you about your business problems that are not being addressed in a DP environment and that we might be able to help you with." They are very quick to offer ATT — the application transfer team. It's a closed-door session in which they bring in their people, they bring in a moderator and have a very good discussion. We're always part of that session.

We realized that we were complaining about IBM, but in point of fact they were doing something that we should have been doing on our own. We are now becoming more aggressive on that basis.

**Neill:** I found, though, that IBM is far less able to tell me anything meaningful in an application area than they used to be. When I was a systems engineer there, they were not unbundled when I started, and I went out to a customer and I did everything and anything. I learned about their whole business. My systems engineer today doesn't even blink about anything except IBM systems software — CICS, MVS. They don't know accounts payable exists. So they don't have any expert advice to give me or my users in that area. And therefore, they have some capable people who can go out on a fishing expedition, but they are not going to understand a lot of questions that are raised, because they don't know the business. They used to know it better.

**Carlson:** And again, you are going to get a very biased response as an answer, and I worry about that. Because ultimately, one of our jobs is to take a look at the panoply of systems and services and match that up to the business. That's ultimately our job. It was mentioned earlier that MIS people are starting to be groomed more as business people. I absolutely applaud that trend, because you cannot abdicate your responsibility of technology leader-

> *'I keep IBM away from the users, unless I go to the meeting with them or IBM comes to me with something and it makes sense.'*
>
> — Saks' Stewart Neill

ship. If you don't do it, you end up having other people do it for you. Later on down the road you might find yourself painted into a corner you didn't want to be in.

I have to recognize the realities of budgeting and not being appropriately staffed. You have to ramp up to it. And if you don't have the infrastructure at the time, you have to default to other more conservative positions just to be able to provide some level of services at all.

But ultimately I feel it is the responsibility of the MIS people to be able to have the internal wherewithal to look at the environment and decide what technology trends are emerging and which ones are going to be best in their business.

**Giannanotonio:** I agree. You have to play a more proactive role. We have IBM do that in our shop, perhaps not as aggressively as in your shop, Mike [McLaughlin]. But we have to do that more, go out to the departments and look for areas where we can increase that white-collar productivity and bring that type of technology and capability to those departments and integrate it within the current environment. The vendor is going to be biased, as you said. They only know one solution. You can't fault them for that because that's what they've been trained to do.

**Neill:** I spent 10 years with IBM, and I knew their product line inside out. When I left IBM for Saks, I found out that I was not a knowl-

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**Continued from previous page**
with IBM, because I didn't know anything else at all. And, in fact, that is a very limiting situation.

I currently read trade journals that I never read when I worked for IBM. I get literature from all kinds of other vendors, and I am much more aware of the options and possibilities, especially in the software area where IBM is not particularly strong.

## Telecom: Dial "M" for MIS

**What about telecommunications? Have you solved your problems?**

***Riegger:*** Absolutely not. I've been spending a lot of time lately on the telecommunications and networking problems. Telecom is where computing was 20 years ago, it's very undefined. We spend a lot of money on it; it is not standardized. We're faced with the problems of the voice and data worlds coming together, and they are so far apart, it just continues to astound me.

You talk to IBM about general networking and they will talk Systems Network Architecture, and they think SNA is the totality of the networking solution.

You talk to AT&T and you get Integrated Services Digital Network, and that's the totality of the networking solution and that will solve all your problems.

We're trying to get better control over how much we spend and what we get out of our networking solutions. And we are trying to integrate more but only where it is appropriate for the business. That's where I find the challenge.

But it's still a very new, volatile segment of the MIS inventory. It's a key function that we have to learn to manage — if we haven't already — and to get that segment of the MIS business satisfying and oriented to the business goals of the corporation.

**Is it tough to find good people to take on telecom problems?**

***Riegger:*** Absolutely. I find people are very localized in terms of their expertise. They also have difficulty translating that in terms of the business objective.

It's so easy in telecommunications to get lost in the bits and the bytes. You get lost in discussions about protocols and standards and hardware, and it's very hard to tell from those discussions what the impact on management and the business will be. I struggle with that a lot.

***Neill:*** My approach is not to make any major commitment in any direction in that area that I can avoid, because whatever I do is almost guaranteed to become obsolete. It's so unstable and so undefined that my general feeling is that unless you have something in telecommunications that has a very rapid payback or your company can't do without it, go with the simplest, least investment-intensive solution you can for the short term

I think it's going to be five years before you can get anything in that area with any confidence — or at least three.

***Riegger:*** Maintaining your flexibility is a viable strategy. If you feel some given area hasn't been really sorted out sufficiently yet, then wait, if you can wait.

**Can you put senior management off that long?**

***Riegger:*** I think so.

***Neill:*** It depends what you need. I'm communicating. My entire company is on-line, every store in the whole corporation is on-line all the time with multiple terminals. Some of it is jerry-rigged and some is not. The response time in some cases could be better, but I have no serious problems. I have no voice/data combinations at all. I constantly look at the solutions, and they look like they are going to cost a lot of money and be very high risk in terms of being the right ones two or three years from now. So unless it has a very short payback, I'm staying traditional and conservative and renting and not buying anything, trying to buy time.

***Carlson:*** The vendors are coming out with new technologies just to be able to make another buck at our expense. You can always shoot yourself in the foot in technology. To the extent that one can keep one's discipline and sanity and only take those risks that you be

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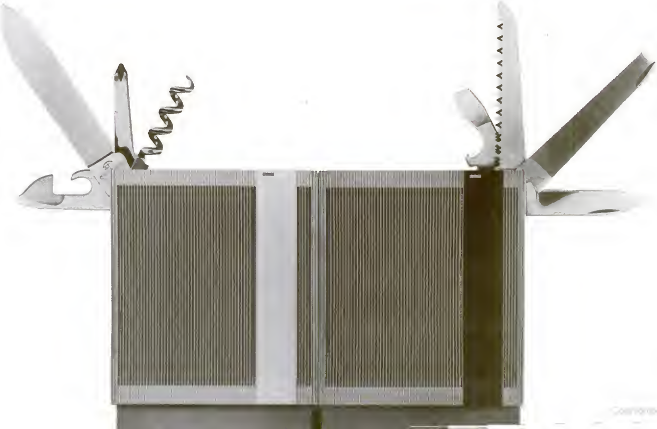

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deemed necessary because of the perceived upside or benefit it can confer to the organization, I would say leave well enough alone.

***Riegger:*** But even leaving well enough alone is a decision. You structured something, you can't stay out of it. Even if you are going with more traditional products, you are making a decision.

***Giannantonio:*** Do all your groups have both voice and data responsibilities?

***Everyone:*** Yes.

***Riegger:*** We've organizationally merged them. But the reality is that there are still pockets more oriented toward data and vice versa.

***Giannantonio:*** We've had voice and data together under the MIS function for eight or nine years now.

> *'I think IBM always performs a little better when there's a little competition around. The unfortunate part is that in the last few years, they've sort of sewn up the mainframe business.'*
>
> — Empire's Geri Riegger

Where I see the biggest savings opportunity is in telecommunications for our business, especially on the voice side. We've strengthened that area over the last year, adding resources, because it has such great impact on cost.

***McLaughlin:*** You asked if we can hold management off for five years. It's not so much holding them off, but it is becoming more and more of an ongoing concern — are we maintaining a proper telecommunications position? What's written in the press is that other people are doing this and this and this. Should we be doing that? It's not so much a mandate that we must do it. But is not doing it the right decision? And management wants a comfort level to ensure that we're not falling behind the rest of the world. Demonstrating that not doing something is the right thing is difficult.

## MIS needs for the future: The wish list

**What's on your wish list for the next year?**

***McLaughlin:*** Mine is in the end-user area, not so much in end users using PCs, but we must move from an environment where any computer project is owned by the MIS group until it's delivered. And then when it's delivered, we'll tell you what's wrong with it. We're moving away from that.

But we need to turn the situation around, so that in point of fact, users believe they own the system from the day-one decision to design it and that we really just work for them and with them. We're working toward that, we're making progress. But in our company, that's a change in the way things have been done over the last 25 years, and it won't happen overnight. For the future, it has to happen.

***Giannantonio:*** Instead of a wish list, I could give you a laundry list. With the information requirements being demanded of us today, I would certainly like to have more skilled people with a broader exposure to this environment. I don't know if they are there. They may be in scarce supply. But you need those types of resources to facilitate your ability to move out and get to where you should be going.

I'd also like to have a very comprehensive plan put together, better than what I have today, so I can have a road map to get there. And obviously, I'd like to have the resources to change those plans.

***Carlson:*** On the technology planning end, I would hope that we would make a lot more progress in developing some sort of synthetic communications model, a kind of blueprint to guide us in the decisions we make.

The problem in making piecemeal decisions is that eventually you miss certain interactions between the various systems and their life cycles that pose problems later on. If you have a consistent and coherent model, you probably are making fewer mistakes and opening up more avenues for expansion than you would have without it.

We've done a fair amount of work in data base and data-sharing models, so we're probably a little more advanced in that area, but I feel there is a lot more work to do, specifically in the area of data and voice communications. I look forward to being able to develop some type of understanding of the organization and how information flows, and then superimpose some type of framework by which we can make technology planning decisions.

***Neill:*** The area where I would like to see things settle out the most — though it won't happen that fast — is telecommunications, which has tremendous potential but is very unsettled at the moment. And another is artificial intelligence and expert systems, which I see having one of the most dramatic impacts in the history of software — within the next five to 10 years, maybe sooner. A tremendous number of things people do today I believe AI will be able

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In Depth

# Programming masters break out of the managerial mold

*Managers schooled in a large-scale bureaucratic model are too rigid to oversee the production of quality software. Good design requires a master who combines creativity and insight with technical competence.*

By BO SANDEN

The quality of software is a function of the conditions under which it is produced. Today, the intellectual effort needed to design consistent, large software systems remains grossly underestimated, and the creative energy necessary to maintain the conceptual integrity of a system throughout development goes unrecognized.

While the output of software products increases enormously every year, we remain unable to produce consistent software within reliable time frames. The term "software crisis" describes a situation in which ever more error-ridden software is continuously put to use. The crisis has become accepted as a fact of life to such an extent that anyone who finds it natural that a software product should be correct upon delivery runs the risk of being regarded as a dreamy theoretician, hopelessly out of touch with reality.

Software development is overadministrated; it has been fitted into an organizational model appropriate for large-scale industrial production or bureaucracy, where the work element is straightforward and well understood and the emphasis is on managing large groups of people. In such environments, the whole is simply the sum of its parts; if the assembly line has been correctly put together once and for all, the individual efforts will always yield the desired product.

This model does not apply to software production. Such bureaucratic organizations are incapable of producing quality software. When projects do succeed, they owe their success not to the formal organizations but to craft masters lacking official recognition. If the software crisis is to be overcome, these masters must be given well-defined roles in software development.

### Pioneers

In *Programmers and Managers: The Routinization of Computer Programming in the U.S.* (Springer-Verlag New York, Inc., 1977), Philip Kraft identifies the following evolutionary steps in software design.

First, there was the individualistic age. Programming was an exotic phenomenon, and the few idiosyncratic pioneers enjoyed rather unlimited freedom. Then came the large projects. Large bureaucratic organizations needed large computer systems and legions of analysts and programmers to make these work. These organizations saw no difference between programming and the work done in their own industrial or military organizations and arranged the programming project structure accordingly.

Mass-educated programmers were managed by professional administrators, who were generalists with only superficial knowledge of software design. The expertise lay at the bottom of the hierarchy, with the analysts and programmers working at the module level. With the appearance of complicated standard software, a third group emerged: the product specialists with expert knowledge of a specific area, such as an operating system or data base management system.

The emergence of large systems brought about the bureaucratic age, and slogans such as "egoless

*Sanden is currently assessing the development of a new system generation for Philips Elektronikindustrier AB in Holland and Sweden. This fall, he will be a visiting Associate Professor at the Wang Institute in Tyngsboro, Mass.*

ILLUSTRATION BY ALAN WITSCHONKE

programming" marked the opposition to individualistic programming. All programmers were to adhere to rules that would make their products understandable to others and make the individual programmer replaceable.

To this end, documentation became important, although it was often produced unwillingly and perfunctorily, not as an integral part of design. Methodology research addressed project management's needs and developed methods to divide systems into modules that management could conveniently assign to individual designers or small teams.

**Bureaucrats**

The attempts to organize software production bureaucratically have now gone on for almost 30 years, and the software crisis shows that they have been largely unsuccessful. The theory that a software undertaking can be randomly partitioned at the outset of the project, the parts distributed among workers and the finished modules assembled into a running system has been proven wrong.

The organization model — with a generalist managing module designers — cannot ensure quality. The technical competence lies at the module level, but each designer's responsibility ends at the interfaces of the assigned module. The manager has the overall responsibility and the overview but lacks the necessary technical background to handle systemwide consistency and interface issues.

> ***Technical competence lies at the module level, but each designer's responsibility ends at the interfaces of the assigned module. The manager has the overall responsibility and the overview but lacks the necessary technical background to handle system-wide consistency and interface issues.***

Once the system has been divided into modules, it is assumed that no more technical effort is necessary at the system level; project management is a purely administrative task. When system issues arise at later stages, nobody is equipped to handle them.

Sometimes a separate quality control group is installed, but it often lacks both the authority and the energy to actually solve interface or consistency problems, and the group limits itself to issuing standards and checking formal compliance to documentation rules and the like.

**Chief programmer**

Attempts have been made to incorporate the advantages of the individualistic age into bureaucratic software production. Chief programmer teams represent such an attempt. Like the lonesome programmers of old, chief programmers are supposed to have a total system concept in their heads and design the system themselves down to the details.

Unlike their predecessors, chief programmers are each backed up by a "copilot," a second in command who is also well acquainted with the design, as well as a librarian who keeps track of such details as program versions. Junior programmers are assigned the least vital parts of the programming. The approach has not won global acceptance — one reason, perhaps, is that today's systems are too complex to be handled by one person from the conceptual level down to the detail level.

In his book, *The Psychology of Computer Programming* (Van Norstrand Reinhold Co., 1971), Gerald Weinberg sees management as a power structure that is independent of actual software development. He urges managers to leave the programming team alone and let the members organize themselves democratically. Neither he nor Kraft attributes constructive roles to software product managers. Kraft even foresees that the low-level administrative function will become superfluous and will be eliminated.

One spontaneous reaction to overorganized system development is the hacker subculture with its hero, the lonely, night-working youth communicating with his colleagues via computer mail. (I use "hacker" in a neutral sense to describe a computer enthusiast.) In her book *The Second Self: Computers and the Human Spirit* (Simon & Schuster, 1984), Sherry Turkle describes another reaction: A middle-aged module programmer, frustrated by the limited scope imposed on his work at the office, buys a personal computer. Working on his own project at home, he enjoys the motivation that comes from seeing the whole picture.

**Champions and masters**

Even though real-world software design does not fit in the bureaucratic model, successful software systems are produced. According to my experience, this is due to the existence of a formally unrecognized employee category: the mastermind.

In addition to the managers, module designers and, perhaps, specialists, each successful project probably has a mastermind — someone who unofficially assumes the responsibility for the conceptual integrity of the design. Perhaps an ordinary

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— with a gift for seeing the total picture takes charge of the entire project. In another possible case, the project manager is technically competent enough to mastermind the design, although formally he is only supposed to be an administrator.

In recent years, interest in traditional industry has begun to shift away from army-like, hierarchical organizations and assembly lines. The bestseller, *In Search of Excellence*, by Thomas Peters and Robert Waterman Jr. (Harper & Row Publishers, Inc., 1982) showed that the success of important companies is based on such criteria as motivation, individual recognition and support of the champion — the individual promoter of an idea.

The intellectually demanding character of software development makes these findings especially relevant to that industry, in which the results depend more heavily on the individual effort than they do in other lines of business.

The champion has much in common with the unofficial master of software development. At a time when champions are recognized in industry in general, it is logical also to recognize the master — the experienced designer who combines leadership with technical competence and assumes personal responsibility for the quality of a system being produced, just as a programmer feels responsible for the integrity of a module.

#### Knowledge not always skill

The master's role differs from those of the individualistic programmers: the chief programmer, the specialist and the generalist manager. A master is not a one-man show. Development and description methods have evolved notably since the individualistic age, when a programmer had to keep the system idea in his head until it had been coded, since the only way to express it was in a functioning program.

Today, the master does not get involved in programming details but maintains a level of abstraction in order to control the logic of a large, complex system. He works with diagrammatic descriptions and specifications and leaves the programming to others.

A specialist with detailed knowledge of a certain system is sometimes thought to be the ideal designer for another, similar system. This is not generally true; this is another example of the confusion of knowledge with skill in software design.

While eminent specialist knowledge is necessary for maintenance, design skill is based on experience from principles. For this reason, the master is normally not a specialist.

The administrative manager and the master both work with other people. But while the manager usually confines himself to pure coordination and needs only sufficient technical knowledge to understand what programmers tell him, the master must have the technical authority to give concrete advice and solve problems. While managers tend to be interested in *what* a system does and leave the *how* to the programmers, this latter aspect is very much the master's concern.

#### Risks

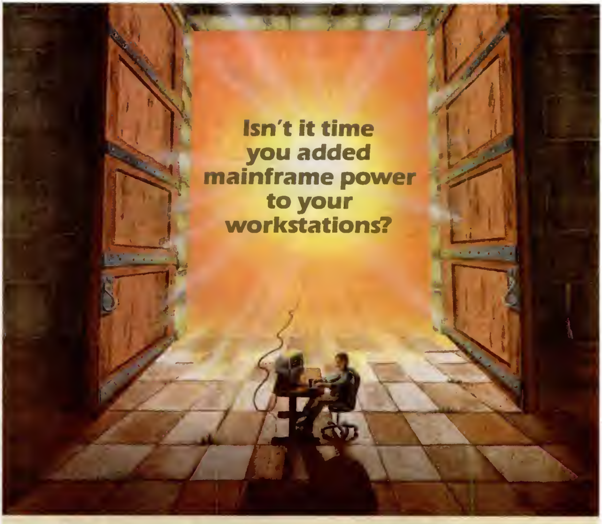
Sometimes such a master emerges at a stage when the formal project organization has reached a degree of despair. Typically, all modules seem to remain 90% ready forever, and the integration test reveals no end to the new errors that cannot be traced to specific modules.

If an unofficial master saves the project, all is well. Nevertheless, it is unhealthy to build an organizational philosophy on the random appearance of an unofficial actor.

There is also a concrete risk: If the conceptual integrity is maintained by someone unrecognized by the official power structure, it can easily be lost by an inadvertent move by the authorities.

In one case, a young analyst who unofficially masterminded the development of a real-time system was disappointed with the lack of support and recognition from management.

Finally, a salary dispute made the situation acute. Although the analyst stayed on, he lost interest in the project. He no longer informally supervised the design work of the others and no longer volunteered his assistance to the operating system specialist, who lacked



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the imagination necessary to find the hard bugs.

Formally, nothing was changed. Administration thought it could afford a single disgruntled analyst, assuming that the negative effect would be limited. But in reality, conceptual integrity was lost. The project went into total disarray and finally collapsed.

In another case, a key employee quits before managers realize that he plays a vital role in the project from a formally subordinate position.

To maintain the role of technical coordinator without formal authority takes tact, since people will resent anyone trying to impose himself on them with a supercilious attitude.

When such a low-key individual leaves, the hole left in the formal organization is hardly noticeable, and a manager who is sufficiently distanced from day-to-day work cannot picture the employee as the chief support of a project.

For an administrator, skill is harder to recognize than knowledge, which can be measured in years of education and number of courses attended.

#### Master-led design

Although masters are useful at various stages of the software life cycle, their role is perhaps the most clear in system design. Design starts with the definition of a problem and ends with a system ready for implementation. Regardless of size, it is vitally important that the entire problem be assigned to the master.

Managers must resist the temptation to divide it into subproblems and give them to different group masters. Premature division easily leads to unnatural modularization and unnecessarily complicated interfaces. Modularization is a technical issue that is accounted for later in the design process.

To tackle the design problem, the master is provided with a small group of specialists. The master is not selected for specialist knowledge but rather for design skill and experience. Thus, the problem may require an operating system specialist, a data base specialist or a data communications specialist — among others — as well as programming or programming language expertise. The group may also contain other designers.

In the group, the master primarily plays the role of a moderator who invites ideas, fits them into the total design and successfully revises them in the light of new developments.

While the specialists ensure that all technical

ceptual integrity.

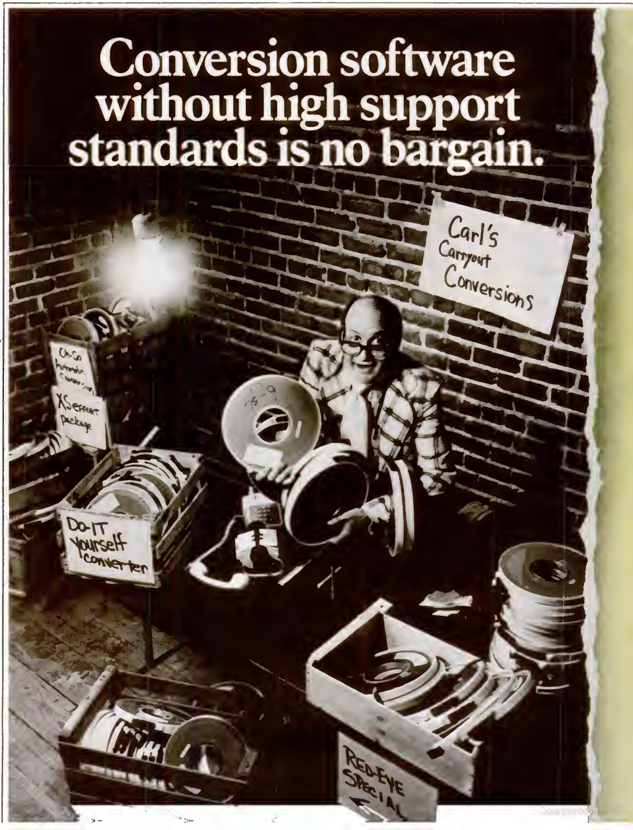
He rejects suggestions that cannot be reconciled with the limitations in mind and sees to it that the design is kept within bounds. He also looks after such long-term aspects as adaptability and maintainability, which are otherwise often neglected until the last stages of a project.

The result of the design must be a functioning system on paper, manifested in a design specification. Before this is achieved, the system structure will probably undergo drastic changes, possibly simplifications. Design should be a phase of controlled creativity in which new ideas are welcome.

The design team is not a committee, and the specification is not a committee product in which disagreement can be hidden behind vague phrasing.

Fred Brooks, who introduced the term "conceptual integrity," writes in his

> *The master does not get involved in programming details but maintains a level of abstraction in order to control the logic of a large, complex system. He works with diagrammatic descriptions and specifications and leaves the programming to others.*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book, *The Mythical Man-month* (Addison-Wesley Publishing Co., 1982), "Design must proceed from one mind or from a very small number of agreeing resonant minds." The master is responsible for the specification, just as a programmer is responsible for a program and remains so until the system works.

Unlike a program, a system design, as expressed in a document, cannot be tested until it is implemented. Still, the master must feel about the specification as the programmer does for his program. The design document is a rendering of a system that is working in the master's mind.

A method of describing the system being developed is the master's most important tool. The design is constantly evolving and being enhanced, but must remain well defined for all involved at each stage.

Thus, documentation actually maintains a more central role in master-led design than is oftentimes the case today, where it may be seen as a boring obligation and often becomes a rerendering of an already implemented system.

It is important to find a representation suitable to the problem at hand. Detailed flowcharts are usually inadequate tools for a design group, but fortunately other methods — for example, methodologist Michael Jackson's diagrammatic notation — are now available.

Modularization is an integral by-product of the master-led design process. This is not the arbitrary assignment of the bureaucratic model, in which task division is determined at the project's outset by its administrator before any real knowledge of the system has been developed.

Instead, independent, well-defined modules are allowed to evolve naturally from the master's thorough understanding of the system design.

It is the responsibility of the master-led group to partition the system being designed into well-defined subsystems, so that the internal structure of each subsystem can be designed independently. Sometimes subsystems have such clear interfaces that they can be called orthogonal.

#### Continued development

Once the interface has been agreed upon, the subsystem design can proceed in parallel coprojects. More often, the subsystems have more complicated interfaces, and their internal structure depends heavily on overall design.

> ***The design team is not a committee, and the specification is not a committee product in which disagreement can be hidden behind vague phrasing.***

Such subsystems are developed in subprojects, which start when the overall design is complete. Subprojects and coprojects are defined on technical criteria as an integral part of design.

For example, in a microcomputer-based transaction system, an orthogonal relationship was defined between the multipurpose transaction control system and the set of transaction programs, which were tailored to the needs of a specific customer. An interface was defined at an early stage so the transaction programs and the control system could be developed in parallel coprojects.

The control system itself consisted of two subsystems: a real-time kernel to which the transaction programs would interface directly and a set of utility programs that were to be run after hours. The utilities had a complicated interface, since they were to work on the internal transaction log files.

Therefore, control system design continued as an integral activity until the file structure had been defined in an overall design specification.

Then, two subprojects started: one for the real-time kernel and one for the utilities. To maintain integrity, the kernel was developed in one piece by a two-man team.

However thorough the original design process, it is

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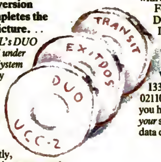

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be required during later subprojects and implementation. Masters have the continued responsibility to maintain the specification; revise it as flaws are detected; and to interpret, clarify and enhance it as necessary. They handle the change requests and ensure that changes and enhancements are made elegantly and in the spirit of the original design.

Masters must be available for such continued efforts until the system has been completed and therefore should avoid getting deeply involved in any specific part of the implementation.

> ***It is stimulating and healthy for those entering the software development field to know that there is much more to learn from working directly with experienced masters and particularly that there is more to software mastery than technical perfection and expert knowledge of existing products.***

#### Developing potential masters

Besides managers and programmers, today's software industry recognizes the category of technical specialists. Organizations have long realized that the promotion of an experienced technician to an administrative position means the loss of valuable technical knowledge. A dual ladder has been invented on which technicians can climb to prestigious positions without administrative duties.

These organizations should now recognize the masters, who differ from specialists in important ways. Where the specialist possesses deep and narrow knowledge, the master is characterized by widely applicable skill.

Still, the master is not a generalist who spends a few years at the beginning of his career in development getting a feeling for the trade while never losing sight of his management career.

On the contrary, the master has probably experienced some hacker years. Technical credibility is the master's chief asset even when formal recognition is achieved, and this credibility comes only from solid, hands-on practice.

It is the responsibility of management to identify and develop potential masters. Masters-to-be can be found among the young technical enthusiasts — the hackers of any software organization. Perhaps they can be distinguished by a wider range of general interests than the specialists-to-be.

Positive guidance is needed to lead apprentices on their way toward mastery. Left to themselves, hackers tend to remain hackers and gravitate toward technical specialization.

Their elders must show them the way from the direct involvement with the code to successively higher level descriptions, although they may first hesitate to enter the thin air of specifications, finding work at the development terminal more directly rewarding.

The next step is to guide the apprentice from one system to the next to widen his scope. Technical enthusiasts' identification with their first systems may easily lead in the direction of eternal involvement through development and maintenance — toward specialization and away from mastery.

The personal commitment to the quality of the product is an asset, but it must be applied successively to larger assignments, where it is impossible to control every detail directly.

The development structure with subprojects and coprojects gives a natural opportunity for apprenticeship: The apprentice works with the master in the first part of development, then assumes the responsibility for a subproject.

The interest in coordinating other people's work probably develops naturally with the increasing difference in age and experience between the master and the new programmers and designers.

#### Not a trade

While the term "master" evokes associations with older trades, the intention is not to classify programming as a trade rather than as an engineering profession. Certainly, much of a programmer's training is formal, even scientific, and can be given in schools, institutes and universities.

Nevertheless, mastery is not achieved from formal training alone. It is stimulating and healthy for those entering the software development field to know that there is much more to learn from working directly with experienced masters, and particularly that there is more to software mastery than pure technical perfection and expert knowledge of existing products.

The idea of mastery carries with it the notion of professional pride and a personal commitment to quality.

The combination of leadership and technique makes masters good role models for the young enthusiasts entering the profession. At the same time, master-led design is a result-oriented activity aiming at increased quality, more reliable project

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## In Depth

# Voice recognition: Six users pioneer cost-saving applications

***Those who said voice technology would never work are being proven wrong every day. Innovative users who design voice applications for their personal productivity find they have an exciting and profitable tool.***

By JONATHAN EPSTEIN

Voice recognition is perhaps the most highly touted technology this side of the wheel. But for observers of the voice market, the last years have been somewhat disappointing.

Despite the introduction of a new generation of powerful and less expensive personal computer-level voice boards, most voice applications make their home on the machine shop floor and the quality-control conveyor belt. Speaker-independent operations remain a pipe dream with all but the most basic vocabularies.

For 1986, though, the frontier for voice recognition systems looks brighter. Shelley Bakst, a senior analyst with International Data Corp. in Framingham, Mass., predicts that voice vendors will ship 20,600 voice units in 1986, nearly double the figure for 1985. While the large, established vendors will control most of the market, Bakst notes, the infant state of the technology will leave niches for small, brain-intensive companies.

More important, voice recognition applications are finding their way into the corporate office. Most microcomputer-level voice products come already installed with templates for popular applications programs. Innovative users who designed voice applications for their personal productivity are finding they have a marketable product as well.

Voice power is both facilitating old processes, such as report generation and device control, and creating new uses for computers, such as personal computer-based telemarketing. Some more advanced voice recognition techniques are being applied in advanced security devices and biological research.

*Epstein is a Cambridge, Mass.-based technical consultant and free-lance writer.*

### Voice users: your peers?

**Radiology** — N.E. Baptist hospital
**Interactive video** — Davis Audio-Visual
**Stock quotes** — Fidelity Systems
**Insurance** — Harold Weidner
**Security** — National Security Agency
**Biology research** — Woods Hole Oceanographic Institute

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The paperless office is a myth. If anything, today's businesses have more paper to push around than they did before desktop computers became commonplace. In the health care industry, where paperwork translates into insurance revenue, speed in paperwork turnaround is essential.

In any hospital, the department of radiology is a major source of insurance revenue. Staff radiologists spend their whole day making diagnoses based on films of patient examinations.

After the diagnosis is made, a report is dictated onto tape and passed to the typing pool. After the report is typed, usually about 25 lines, the medical administrator sends a copy to the insurance company and is quickly reimbursed. In a large hospital, the process from report to reimbursement takes about three hours. But in a smaller hospital with fewer people working in medical records departments, the process takes longer — sometimes much too long.

Dr. Alan Robbins, chairman of radiology at the New England Baptist and hospitals, had a performance bottleneck at New England Baptist. The five radiologists in his New England Baptist Radiology Associates group would work from 9 a.m. to 5 p.m. examining films and dictating reports, but they did not have the secretarial staff or expertise to keep the records flowing. It regularly took up to a day to get reimbursements back from the insurance company.

In a smaller hospital such as New England Baptist, maintaining a cash flow is of paramount importance, so Robbins decided to implement a voice-controlled reporting system. Together with independent software consultant David Horowitz, Robbins set out to solve the problem.

After looking at products from various voice vendors, the pair decided on the Voicesystem KVS-PPC from Kurzweil Applied Intelligence, Inc. in Waltham, Mass. "My impression in working with the Voicesystem is that it's an amazing device," Horowitz notes. "It's both highly reliable and extremely well built. As a software developer, I know it's unusual to see a product so well put together."

> *Voice power is both facilitating old processes, such as report generation and device control, and creating new uses for computers, such as personal computer-based telemarketing.*

The Voicesystem is a speaker-dependent discrete speech recognition device that currently retails at a single-unit cost of $6,500. Its speaker-dependent trait means that each user's voice has to be introduced to the device. However, the high cost of speaker-independence technology and the low number of potential users made this concern a small one.

A key factor in the hospital's decision to buy the Voicesystem was the system's 1,000-word vocabulary and high degree of accuracy as well as Kurzweil's ongoing commitment to developing a larger vocabulary. "I doubt that any other product can compare in power and reliability," Horowitz says. Clearly he is not the only buyer that feels that way; Dick Pascal, Kurzweil Applied Intelligence's vice-president of sales and service, estimates that the company has shipped more than 200 units in the last two months.

#### Quasi-expert system

As Horowitz worked on developing the hardware and software for the system, Robbins set out to codify a standard vocabulary for radiology reports. The physician, who also teaches at Tufts University Medical School, used a Kurzweil Omnifont character scanner to input more than 1,000 radiology reports into an IBM Personal Computer.

After performing linguistic analysis on the set of reports, Robbins came up with two sets — one small, one large — of the words and phrases most commonly used in insurance reporting. Roughly grouped, there are phrases used for normal examinations and those used in the final free-text portion of the reports. The effort took Robbins about four months and a considerable amount of personal expertise to complete, leading Horowitz to call it a "quasi-expert system."

Users have to train the machine to understand their voices by going through an enrollment procedure. Horowitz replaced the Kurzweil-supplied enrollment procedure with one of his own. "I've designed the enrollment procedure around the radiology vocabulary," he explains. "The user has to repeat approximately 300 words three times. The words we use range from 'yes' and 'no' to longer words like 'arterialsclerotic.' "

Because the Voicesystem is a discrete speech recognition device, users must pause 250 microseconds between each word. This quarter-second pause between words is no problem whatsoever, Robbins says. Even after only a partial enrollment of two repetitions a word, the system will operate at more than 95% accuracy.

Horowitz purchased a standard IBM Personal Computer XT with 640K bytes of memory, a 10M-byte disk drive and IBM PC-DOS. Because the reports have to be dated, Horowitz purchased a clock board for the computer, which arrived bundled with Borland International, Inc.'s Sidekick desktop management software. After playing with Sidekick, Horowitz decided to use the program's Micropro International Corp. Wordstar-style editor as his interface to the Kurzweil system. Using Robbins' smaller vocabulary set, Horowitz set up the first version of the reporting system.

The radiologist receives his films and examines them. As he makes his diagnosis, he dictates it into either the Kurzweil-supplied headset or a telephone handset. The report appears on the monitor of the PC as the radiologist dictates it. If a mistake has been made, he is able to backtrack verbally and correct the error.

If the report is ready to send to the insurance company, the radiologist inserts the patient form into the system printer and tells the system, "Print this."

"When users are equipped and familiar with the system's use, what took 15 minutes will now take 30

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implementing the larger vocabulary set. According to the consultant, this 900-word vocabulary "is adequate to cover every possible normal examination and 85% of the possible abnormals. For the other 15% of the abnormals, it is likely that the radiologist will spend more time on the report anyway."

Other departments at New England Baptist have already shown interest in Robbins' voice recognition application. A representative from the admissions department, having observed the development of the radiology system, is excited about implementing one of his own. Having gotten the jump on the rest of the radiology field, Robbins is currently examining the prospects for marketing his system to radiology departments throughout the U.S.

The hardware implementation was easy compared with the vocabulary analysis, Horowitz suggests. "When people know what they want to do, it's easy to get a system up and running."

#### Programming frustrations

Robert Newman knew what he wanted to do. Newman, a developer of interactive video systems, started using voice capability a couple of years ago to alleviate his programming frustrations. Now, with his son, Newman is announcing what could be a multimillion-dollar product.

"Basically, I'm a video producer — that could be a career in itself," Newman states. "But I understand how to make a computer do what I want it to do, so I put the two together. I wanted absolute control over the videodisk."

Newman started using voice recognition a couple of years ago at Davis Audio-Visual, Inc., a company that configures video systems for large commercial, industrial and military users. In addition to doing research and development work for Davis in its interactive video department, Newman used the company's equipment to design and produce videos for outside clients.

At the time, such a task was labor intensive. "Quite frankly," Newman says, "I couldn't type. After seven years of intense programming I still can't type. I guess I have a mental block when it comes to learning how. Unfortunately, it takes a lot of code to drive the video controllers."

Newman's introduction to voice came at a communications trade show, where he saw a woman issuing commands to her Apple Computer, Inc. computer through a microphone. He immediately realized the potential of voice recognition and persuaded the managers of Davis Audio-Visual to allocate some money for a voice recognition experiment.

Newman selected the Voice Connection Introvoice III IBM PC replacement keyboard for his first venture. "I looked at a lot of other products," he explains, "and a lot of them aren't around anymore. Basically, my PC was too full to handle another board." While the keyboard has only a 150-word vocabulary — low by today's standards — it was more than sufficient for his needs.

He attached the keyboard to a Leading Edge Products, Inc. Model D IBM-compatible personal computer, which was configured with 512K bytes of random-access memory (RAM) and a pair of Toshiba Corp. half-height floppy drives. The computer was already configured with the Model VIPG video board from Oklahoma City-based B.C.D. Associates. The B.C.D. board can do frame-accurate work on either videotape or laser disk.

A Video Associate Laboratories (VAL) overlay board let Newman display his video outputs on the same monitor as his computer output — in this case on a Sony Corp. KV26 26-in. monitor. The computer output is sent to the monitor in a red-green-blue signal, and the videotape and laser disk outputs are carried in a composite video signal. All synchronization is done on the VAL board.

Newman's first application of the Introvoice III was to control the two special video boards in his PC. At first, all of his experiments were confined to a single laser disk of Van Gogh's works. But that was plenty.

"There are a lot of system calls used by these video boards. Couple that with the 50,000 frames on one side of a laser disk, and you have a lot of programming possibilities," Newman explains. So he used the Voice Connection's Voice Utility Program to create his first vocabulary file. After deciding how to define his words, he input the definitions into a

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> ***The Interactive Classroom preserves the role of the teacher. Teachers can create their own video segments. The teacher decides what to show, when to show it, the nature and order of the questions and how long the students have to answer each one.***

text file. Then the machine displays the words on the screen and listens for vocal input.

The machine runs through the list three times in an enrollment procedure that takes about half an hour. "My worst problem came during the spring — I have hay fever," Newman remembers. "The Introvoice didn't understand the congested me. Now my congested voice has been enrolled also."

**Pushing vocabulary limits**

The system Newman set up two years ago is still in use today. The Introvoice III is a speaker-dependent board, requiring a separate vocabulary file for each speaker — supposedly. "That would be too easy," Newman jokes. He likes to train the Introvoice III to understand any speaker. He, his secretary and anyone else who happened to be around input each word a total of seven times. After such an enrollment, the keyboard will understand any speaker 97% of the time, Newman claims.

He has created some 50 vocabulary files to control his different laser disks and tapes. The B.C.D. board's macro capabilities let Newman create powerful commands easily.

"In the Van Gogh disk vocabulary file, for example," says Newman, " 'Chapter 2' means 'FIND 1287; PLVB 1423 <CR>.' " When he says "Chapter 2" into the Introvoice microphone, the laser disk player finds frame number 1287 and plays both the video and audio tracks until frame number 1423. "Browse" and "Step" perform those laser disk functions, and "Nude Lady" brings up and holds the frame with a Van Gogh nude. Other commands will quickly load new vocabulary files from disk, making the vocabulary of the Introvoice III virtually limitless.

Unlike the telephone system, which operates at a bandwidth of 4 kHz, the Voice Connection's keyboard listens on a wide frequency bandwidth and thus will not accurately understand commands over the phone. Newman has found two ways to get around this problem.

Using the Voice Utility Program's Edit mode, he can alter individual bits in the word profile to "open the translation window." In addition, using a pocket Touch-Tone dialer, he has coded his commands in the form of tone sequences. These narrow bandwidth signals can be understood in person or over the phone lines. In a more promising application, Newman uses the Touch-Tone commands for machine-to-machine control.

Using a 1,000-frame disk with which to experiment, Newman created a sound track to accompany the disk and recorded it onto the audio portion of a videotape. Using the B.C.D. board to control both the videotape and laser disk players, he starts the two running. Embedded in the sound track are barely audible Touch-Tone commands that instruct the laser disk as to what to do.

Excited by the prospect of voice in interactive video, Newman quit his full-time job at Davis Audio-Visual and went into business as a consultant. His clients include United Airlines, the state of Colorado and Nebraska's Creighton University. Since that time, he has purchased the Introvoice V card ("two generations ahead of the III") and the Introvoice card for the Apple II.

**Voice in the classroom**

Newman and his 17-year-old son, also named Robert, have designed their largest project to date — The Interactive Classroom — based on an Apple IIe. The Interactive Classroom consists of the Apple IIe configured with the Introvoice, B.C.D. and VAL cards. In addition, a card from Englewood, N.J.-based Reactive Systems, Inc. connects 30 transponder key pads to the computer. The computer is hooked up to a Panasonic Co. AG-6200 VCR and a Zenith Electronics

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> ***When speech recognition is coupled with speech output capability, a whole new field of applications opens up. Voice-configured systems can interact with remote users without requiring an operator to be present.***

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Unlike other computer-aided educational tools, The Interactive Classroom preserves the role of the teacher. Using the younger Newman's camera driver, teachers can create their own video segments. The teacher decides what to show, when to show it, the nature and order of the questions and how long the students have to answer each one.

The Newmans' product is being tested in several Colorado school districts. One does not have to be an educator to realize the enormous potential that the product has in U.S. school systems. Its voice functionality allows the teacher to use it with a minimum of training.

"Voice is phenomenal — it can be very good or very bad," maintains the elder Newman, an avid fan of Kurzweil Applied Intelligence founder Raymond Kurzweil and his work. "It is a stepping-stone to the true artificial intelligence age. Remember that it is not a means to an end but merely a tool."

### No operator

Neither Robbins nor Newman needs voice recognition to perform computer applications — voice recognition just makes the tasks much easier. However, when speech recognition is coupled with speech output capability, a whole new field of applications opens up. Voice-configured systems can interact with remote users without requiring an operator to be present.

The AT&T Conversant 1 system provides speaker-independent recognition of "yes," "no" and 6,000 combinations of the digits over telephone lines. Boston-based Fidelity Systems Co. is field-testing the AT&T unit. The investment company's 6,000 clients can call in and get the latest quote on their portfolios. Fidelity sees the Conversant-1 as a means of freeing up personnel for other tasks.

The AT&T system will cost users at least $50,000 each and is aimed at larger businesses with considerable

puter boards and targeted them at the individual user.

Both Votan Co. and Texas Instruments, Inc. make voice boards for the IBM PC that incorporate speech output capability as well as speech recognition.

Whereas machines such as Digital Equipment Corp.'s Dectalk synthesize speech from text, the Votan and TI boards store human voices in a digitally compressed format. These boards incorporate their own processors so as not to incur any overhead on the IBM PC's main processor. The Votan board is built around a Motorola, Inc. 6809 and a proprietary very large-scale integration speech processor and can do serious telemarketing without overloading the main processor.

### Checking leads

Harold Weidner's insurance brokerage house had reached its capacity. While there was much more business to be uncovered in Rapid City, S.D., Weidner just didn't have enough manpower to cover it all. Sales representatives had to spend hours on the phone checking out initial sales prospects before they could set out into the field.

Then, in the fall of 1985, Minnesota-based Cantus Corp. released its Solicitor I telemarketing system. Cantus uses the Corona Data Systems, Inc. IBM PC-compatible microcomputer — configured with a 10M-byte hard disk drive, a single full-height floppy drive and 512K bytes of RAM — and installs the Votan VPC-2000 Votan Voice Card. It then loads its Solicitor I telemarketing software onto the hard disk. As Votan products use a bandwidth of approximately 4 kHz for their voice recognition, the same bandwidth as that used by AT&T and the divested Bell operating companies, there is seldom any problem with speech recognition over the phone.

Weidner decided to give the system a try. The telemarketing system can record up to 99 different scripts to use over the telephone. The user reads a script into either the telephone handset or the microphone leading to the Votan Voice Card. The card stores the speech digitally, compressing it some 16 times.

Weidner identified different groups of prospects based on demographics data and created a script for each group. After he entered the phone numbers of the prospects, the telemarketing system was ready to run.

The software dials the first prospect listed in the data base and initializes a report file for that prospect. If no one answers the telephone, the software notes that fact in the report and goes on to the next prospect. Once someone answers, the Votan voice card goes to work.

The card replays the script the user has selected. For example, it

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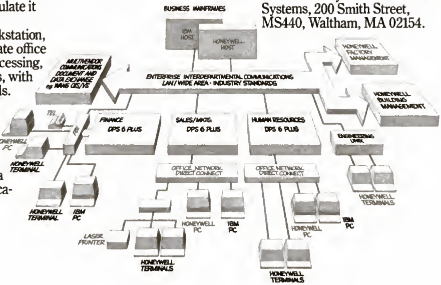

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moment to answer some questions? Please answer yes or no." The card then records the answers, sends the information to the user report file and takes the appropriate action. If the prospect says no, the machine thanks him and hangs up. If the prospect says yes, then the machine continues through the script.

Even though the Votan Voice Card is a speaker-dependent voice recognizer, it can distinguish between "yes" and "no" in over 90% of the cases. Customers can also answer questions using a push-button keyboard.

At the end of each script, Solicitor I asks the prospect for his name and any comments, which are compressed by the VPC-2000 and stored on the hard disk. The sales representative can either monitor the sessions and participate if desired or let the IBM PC work unattended for as long as disk space remains. At the end of a session, the representative can obtain a two-page hard-copy report on each phone call made that records which script was used and what the responses were. The software automatically time-stamps each record.

Weidner now has two systems of his own. "It's great. If I run the machine three hours a night, it generates enough appointments to keep a salesperson busy all day," the insurance broker says. He points to the high quality of the Votan voice reproduction as a major factor in the system's success. "While we may be getting used to it, no one really likes to talk to a machine. But the Votan reproduction is close to perfect. People absolutely did not know they were talking to a computer."

#### In business himself

As Weidner sees it, in the insurance business, the Cantus system can pay for itself in 90 days. He realized the system's potential and, after sounding out some friends, he set out to be a value-added reseller for Cantus.

Success Methods International, of which Weidner is director of sales, packages the Cantus system with specially targeted user data bases. The system retails at a base price of $8,995, with an additional cost of $60 per 1,000 names.

The system's 10M-byte hard disk drive can hold up to 10,000 names, Weidner says. While most of his buyers are in insurance or other direct sales businesses, he maintains that "it's ideal for any sort of repeated phone work, be it telemarketing, public opinion polling or market research." The only difficulty Weidner has ever had is transmitting over some of the non-AT&T phone carriers — such as MCI Telecommunications Corp. and GTE Sprint Communications Corp. — which use different frequency bandwidths in carrying their signals.

Both Votan and Cantus are improving their products, and Weidner plans to stay on the leading edge. Votan is improving the VPC-2000's vocabulary of 640 words, and the company's director of marketing, Jim Cook, says the company can double it. However, he notes that "most applications don't even need 640 words."

Of more interest to Weidner are developments on the software side. Cantus is developing an interface to the Able-1 word processing package. Using this, users could personalize letters to prospects, incorporating responses to various questions in the script. The company is also incorporating an elapsed time feature into its telephone manager. Designed primarily for lawyers, the enhancements mark the time elapsed on each call. This brings up an interesting question — should the lawyer's client pay lawyers' rates for calls made exclusively by a personal computer?

#### Plugging security gaps

Security is big business. Research-intensive organizations simply cannot afford the release of any sensitive material. However, security managers at high-security installations are becoming increasingly aware of the inadequacy of traditional security systems

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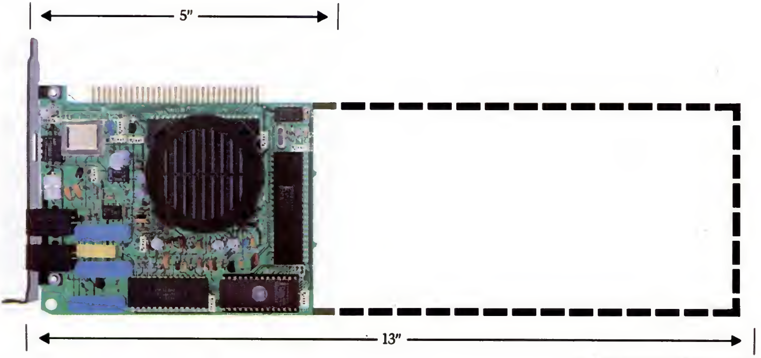

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actually holding the card. And even sophisticated call-back modems are "easily defeated by any ex-telephone technician," notes George Rylander, president of Voxtron, Inc. of Braunfels, Texas. According to Rylander, savvy security managers are turning to biometrics as the solution to their problems.

The science of biometrics analyzes the set of physical characteristics that are unique to a person. This includes the person's retinal pattern, typing rhythms and pressure patterns, finger length, palm topography, fingerprints, signature and voice.

While vendors are conducting research in all of these areas, until recently the only biometric security devices available were the

> ***Whether it is used to recognize human speech or heron screech, voice technology offers powerful tools for existing applications and building blocks for new ones.***

retinal scanners. While virtually foolproof, these systems are also extremely expensive. But Voxtron and others have now come out with voice-based security systems.

The Voxtron Veritron 1000 security system is based around TI's Business-Pro microcomputer. The computer is configured with a 21M-byte hard disk drive and a 1.2M-byte, 5¼-in. floppy drive. Voxtron adds a modified version of TI's TI-Speech board, which incorporates voice verification algorithms developed by George Doddington in 1974.

The Business-Pro also contains a board that controls all of the security points, whether they are locks on doors or power to a personal computer keyboard. A printer completes the central unit, which is connected by telephone lines to the security points — in most cases, locks on doors.

"When someone wishes to enter a given door," explains Rylander, "he first inputs a personal identification number [PIN] via the telephone handset. This isn't really security at all — at best very low-level security — but serves to tell the computer which voice templates to examine. After the PIN has been entered, the computer says a random phrase over the telephone and asks the person to repeat it.

"Veritron tries to verify him to repeat the phrase. If this doesn't pass, the computer asks to hear the phrase a final time."

In all, the Veritron checks seven voice profiles against the one in memory: each individual attempt, the sum of each pair of attempts and the sum of all three. If the subject checks out via voice profile and is allowed in that specific door, the Voxtron device sends a signal that opens the door.

If there is an attempted security breach, the Veritron 1000 can be instructed to set off different levels of alarm. The security manager can have the device call him on the telephone in the event of a breach, pipe the verbal alarm to a central loudspeaker or do nothing but record the attempt. The hard disk is large enough to record the security history for an eight-door (or eight-microcomputer) site as far back as eight months.

A second level of security guards the Veritron user against a security breach. The best-guarded port of entry is the Business-Pro itself. Anyone wishing to use the computer must undergo two separate verifications before being allowed on. The board that controls the doors and power flow to computers provides an invade-defeat circuit that automatically shuts down the area if someone attempts to cut the wires.

"Outside of the cooperative user, the only method I know of [to defeat the Veritron] — and of course we guard against it — is the digital reproduction of someone's voice," Rylander says.

"First of all, each time one of 10 phrases is selected randomly. If the client wishes a higher level of security, the computer asks for a string of digits in random order. While someone could have all the phrases and digits digitally recorded, they would require both a very

The new Diconix 150. At under four pounds,
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> ***'Outside of the cooperative user, the only method I know of [to defeat the Veritron] is the digital reproduction of someone's voice. While someone could have all the phrases and digits digitally recorded, he'd need a fine system and the ability to access digits randomly as fast as the computer spoke them."***
>
> — George Rylander, Voxtron, Inc.

fine system and the ability to access digits in a random order as fast as the computer spoke them. And it's fast."

#### Handling variations

The Veritron can create a voice template for a user in as few as two phrases. The security manager can monitor the level of match that each user achieves against a given template and, if necessary, can supplement the template with additional phrases.

The Veritron tracks the user's voice each time a verification occurs and updates the voice profile.

Rylander gives an illustration: "If you have a cold on Monday morning, you probably caught the virus the previous week. The Veritron monitors the changes in your voice so that your hoarseness on Monday is easily understood. The problem comes when you screamed and hollered the night before and your voice is gone the next day."

If certain users have foreign accents or speech impediments, the security manager can adjust the level of voice match that they must attain or select a special phrase for their use. Or, as in the case of a beta test site in a Southern California foundry, the machine can query Hispanic users in their mother tongue of Spanish.

While Rylander expects a lot of business from government installations, the Veritron 1000 is targeted at the industrial and commercial markets.

"One French perfume company has a security budget of $1.2 million a year," Rylander points out. "While we in the U.S. don't think too much about it, industrial espionage is a major problem in this country."

Voxtron has several units in beta test, in sites ranging from New Mexico's Sandia Laboratories to the foundry in Southern California to the National Security Agency.

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## In Depth/Voice Recognition

> ***'Some people call voice recognition a toy. They used to say, "Gee Bob, what a lot of great toys you've got here." I take a lot of offense at that. You play with your toys. You make money with your tools.'***
>
> — Robert Newman
> consultant

foundry has proven the most nettlesome problem to date. While the TI board operates in noise levels in excess of 95db, the human ear falters. "The hardest part is for the individual to hear the prompt, so we're installing amplifiers to increase the handset output," Rylander says.

As for the National Security Agency, he says, "Their sole intent is to break the system. They have equipment way beyond what anyone else has."

The Veritron 1000 is designed to control 16 phone handsets (entrance and egress through eight doors). Depending on the configuration, it comes completely installed for less than $50,000.

Another model, the Veritron 1200, will interface with currently installed card-key access systems so that the firm does not have to throw away a $100,000 investment.

Alternatively, the 1200 can control a bank of Veritron 1000s to secure as many as 256 locations.

Rylander acknowledges that his system is not foolproof. "Everybody has their price. Employees themselves are the oldest security problem there is." But the system offers many advantages, and he sees the product maintaining continuing sales appeal.

#### Software-based system

In 1983, James and Janet Baker of Dragon Systems, Inc. in Newton, Mass., provided a breakthrough in voice recognition with the release of an inexpensive board that performed high-quality speech recognition using only an analog-to-digital converter.

In the past, speech recognition devices were either hardware intensive and extremely expensive or based on inefficient algorithms and unreliable.

The Bakers, bringing highly complicated mathematics into the voice equation, produced a software-based system.

Biologists at the Woods Hole Oceanographic Institute in Woods Hole, Mass., are using similar software techniques for voice recognition — of animals. Professor Peter Tyack has recorded thousands of hours of whale and porpoise songs onto magnetic tape. Elsewhere at Woods Hole, graduate student Kurt Fristrap is analyzing tapes of bird song.

Using Fast Fourier transforms and pattern-matching algorithms, the two scientists hope to develop a vocabulary of whale and porpoise sounds and, in the words of Dr. Dolittle, "talk to the animals."

Woods Hole is one of the primary users of the Interactive Laboratory System (ILS) from Signal Technology, Inc., which uses the DEC VAX-based program and an analog-to-digital converter to capture the signal data. Woods Hole programmer Kurt Straube has designed a user-friendly front end for ILS that lets the marine-minded professionals worry about sandbars rather than space bars.

Whether it is used to recognize human speech or heron screech, voice technology offers users powerful tools for existing applications and building blocks for new, exciting ones. Those that said it would never work are constantly proven wrong, as innovative users continue to bring their products into the market.

Consultant Newman is adamant on the subject: "Some people call voice recognition a toy. They used to say, 'Gee Bob, what a lot of great toys you've got here.' I take a lot of offense at that. You play

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# In Depth

# Taking the factory out of the office

***What hampers progress toward the "Office Of The Future" is the machine mentality left over from the industrial age. Today's office should take shape according to principles and perspectives of the information age.***

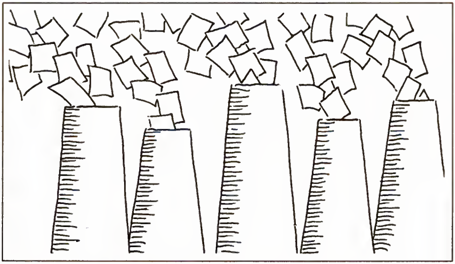

ILLUSTRATION BY P. CHARLES LADOUCEUR

By SAMUEL BLEECKER

American business has invested billions of dollars in computers and automated office equipment. Yet white-collar productivity declined in eight of the last nine quarters. Everyone seems to wonder why the computer revolution fizzled.

Where is the "Office Of The Future"? Why hasn't it helped?

True, computers speed paper flow. The automated office cranks out two, three, even four times the documents it once produced. The American Productivity Center reports that we in the U.S. churn out 370 million new business documents — backed by a stunning 1.9 billion pages of computer printouts — every single day.

New technologies stand poised to accelerate this pace further: The IBM 3800 printer knocks out 20,000 lines a minute — 576,000 pages a day, or enough output to lay down a daily paper trail 100 miles long.

But as former Xerox Corp. Vice-President Paul Strassmann notes in his book *Information Payoff: The Transformation of Work in the Electronic Age* (Free Press/Macmillan, New York, 1985), "If a secretary types 300 lines of mostly useless text per day, it does not follow that replacing the typewriter with a word processor capable of generating 3,000 mostly useless lines of text per day will be an improvement enhancing profitability of the firm."

Increased speed and what we measure as productivity seem not to be goals in themselves. If computers and automated processes do nothing but spawn new ways to speed paper around the office, the results will continue to disappoint.

From my perspective, I don't see the office of today transforming into the Office Of The Future by the abundant application of new technologies. In fact, I see the exclusive emphasis on technology as an anchor that may well sink us all.

### Solutions to the wrong problems

The problems with creating the profitable workplace are not the incompatible technologies that make us gnash our teeth. The roots of the problem reach much deeper — back 250 years to the start of the industrial age, perhaps to 1733 with John Kay's patent of the flying shuttle, which revolutionized weaving and reduced the number of workers required.

Office organization derives from principles that simply do not apply to society today. The office today is organized like the factory — a factory in which the product is paper not pins or

*Bleecker is director of The Innova Office, a year-long exhibition opening in Houston this September that demonstrates how well-designed, integrated offices contribute to productivity.*

**In Depth**/Taking the Factory out of the Office

MITCHELL J. HAYES

## Technology's changing targets

| | Defining Technology | Strategic Resource | Transforming Resource | Product | Organizing Principle | View of Time | View of Progress | Machine Paradigm | Communication |
|---|---|---|---|---|---|---|---|---|---|
| Agricultural Age | Craftsman | Raw materials (seeds, water, soil) | Natural energy | Food | Seasons | Cyclical | Progress in history | Spindle | Conversation (transfer ideas locally) |
| Industrial Age | Clock | Capital (money) | Processed energy (coal, electricity) | Mass-produced items | Product design | Steadily onward | Perfectability of man and society | Heat engine | Face-to-face conference (transfer ideas by transporting people) |
| Information Age | Instruction-based system | Ideas (minds) | Synergy (minds working together) | Information | Inflow (information flow) | Multiplexed | Merger of man and machine | Organism (instruction-based machine) | Teleconference (transfer ideas by transmitting images) |

In the industrial age, the best technology aimed at mass-producing items — beating the clock. In the information age, intelligent machines need to focus their power on creating ideas and synergy.

parasols. Since paper is the product of the office assembly line, the desire to exchange information on paper has directed the development of office design and technologies.

The modern office may be said to derive from the factory: With the production of salable product came the production of records and the employment of personnel related not directly to manufacturing but to office work.

But if we are seeking the solution to office problems in factory-modeled offices, we are hunting for the wrong key. Before we throw more technology at the problem of office efficiency and profitability, we should better determine the real product and purpose of today's office. Once that issue is settled, we can move swiftly from past to future.

### Machine mentality

What hampers the step to the Office Of The Future is the heavy weight of industrial age perspectives that has embedded us in a machine mentality. According to futurist Alvin Toffler, the mechanical view of the world formed the foundation of what he refers to as the "factory civilization," in which we still labor as hostages — even in our modern offices:

"*And this image of a simple, uniform, mechanical universe not only shaped the development of science, it also spilled over into many other fields. It influenced the framers of the Constitution to create a machine for governing, its checks and balances clicking like parts of a clock . . . and the dramatic spread of the factory civilization, with its vast clanking machines, its heroic engineering breakthroughs, the rise of the railroad, and the new industries such as textile, and auto, seemed merely to confirm the image of the universe as an engineer's Tinkertoy,*" (from Toffler's foreword to *Order Out of Chaos* by Nobel Laureate Ilya Prigogine and historian Isabelle Stengers, Bantam Books, Inc., New York, 1984).

### People as accessories

Toffler might have added that the Tinkertoy culture carried from factory to office. The successful paradigm — the machine and the vast assembly line — cranked out the product in an endless stream. The assembly line accommodated the product. The design of the product determined the design of the production process and each element needed to produce it, including the design of the factory and all its machines.

Those who ran factories assembled people, machines and raw materials and processed energy in a single location for the exclusive purpose of manufacturing. The assembly line comprised a continuous stream where all the elements of production came to bear.

It was sequential, mostly linear, in process. A part arrived, a worker or machine engaged that part, in some way added value to it and moved it along the conveyor belt. Each element of the process sat in close proximity to the next element in the line. People aided machines. Where machines could not be designed to carry out the labor, people did.

But people were second choice to machines in carrying out tasks. In a time when productivity was measured by how quickly a unit product could be manufactured, man could not compete with a well-oiled machine. We measured profit simply: We took revenue to date and subtracted costs to date. It was all very neat, very machine-like.

How we measured time, motion and place and, ultimately, how we defined productivity distinguished the factory culture from the agricultural culture that went before it. Each culture had its key innovation — what J. David Bolter, author of

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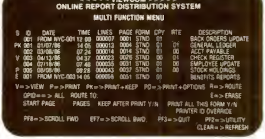

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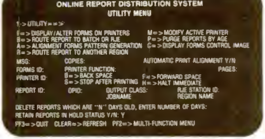

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1984), calls the "defining technology" — which paced, even drove, the age (see chart page 94).

In the agricultural culture, the defining technology was the skilled craftsman, whether the skill was building furniture or growing food. In the industrial age, attention to the new defining technology, the clock, caused industrial age man to alter notions of progress and productivity. Wrote Bolter, "A craftsman may have had to work toward a deadline, but his tools were not measured by their output per unit time (a characteristic development of mechanical technology)."

#### Race the clock

Once the clock began ticking for industrial age man, he viewed the world in constant motion. The gears of machines spun, the engine pumped pistons, rotated belts, pulled levers and the assembly line kept pace. Measured against time, though, technical progress, economic growth, productivity and efficiency became quantifiable goals — measurable, refinable, perfectable as time went on.

In the industrial age, time did march on. In the agricultural age, time was cyclical — tied closely to the seasons. Planting, for example, generally could not happen in the middle of winter; sewing stopped in the dark of night.

But as mechanization took hold in the industrial age, we grew less dependent on the cycles. Assembly lines could work around the clock throughout the year. Time, once cyclical, now moved steadily onward.

Not constrained to "wait till tomorrow" or "hold till spring," factories in the industrial age saw the chance to get a jump on the future. By applying and refining technology, we could actually get ahead — produce more in a period of time than was possible before.

The industrial age also valued its resources differently from the agricultural age. In the agricultural age, the strategic resources were raw materials: seed, soil, water and the like. Abundant but unpredictable sunlight transformed these resources into food. In the industrial age, the strategic resource was capital and the engine of the economy was driven by cheap, processed energy.

But as Toffler notes: "Today . . . the Age of the Machine is screeching to a halt, if ages can screech — and ours certainly seems to. And the decline of the industrial age forces us to confront the painful limitations of the machine model of reality."

The limitations of which Toffler writes were primarily approached in the late 19th century when the success of the industrial age was already well assured.

Factories bustled, product spewed forth, but a dilemma arose: To maximize the enormous capital investment in machinery, the factories had to be kept at full production around the clock. More and more product exited the machine and entered the market. As the industrial revolution matured and the nation moved from scarcity to plenty, the problem was not so much how to manufacture more goods but how to sell them. So what if a factory could produce more — who would buy it all?

#### Enter marketing

As some observers note, this

keting society. Thus the managers, administrators, engineers, secretaries, bookkeepers and sales force grew in stature. No longer secondary in the factory process, they played increasingly important roles in that process.

For example, the ratio of administrative employees to production workers rose from 8.6% in 1907 to 20% in 1948.

At new, robot-controlled, fully automated production plants, the ratio is higher still in 1986 as mechanical "workers" replace more and more line employees.

As the significance of the office in the factory mounted, the office developed in the image of the successful factory model — more precisely, in the image of the factory assembly line in which every element in the process sat close to what came before and after.

The office model adopted the same notions of time — productivity, efficiency — and the importance of a centralized location where all machines and labor were gathered. The office, like the factory, was seen as a manifestation of physical space, not what Stanley Smith, president of AT&T's real estate division, calls "conceptual space" — where people contemplate and create.

The secretary sat in front of the administrator as the gateway for the paper product, very much like a machine that inspected the conveyor belt of bottles, rejecting those unsuitable and forwarding those that passed muster.

Aides to an administrator clustered around the administrator's office. And the offices of one department remained in close proximity to those with which they exchanged information.

#### Elusive measures

In the factory, the steps necessary to manufacture a product were tangible. An industrialist who wanted to improve the product called in an efficiency expert and together they shortened the production cycle, adding a few machines here and there, reducing the labor force and cutting the cost of production.

But in an office, not all that goes on is tangible. As Xerox's Strassmann notes in *Information Payoff*, "The closer one examines the details of office work, the less one knows what is going on."

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to a customer cannot be measured by the automated standards of the mechanical age. In fact, quality, not quantity, becomes the watchword. But quality must be judged, not measured.

The industrial age did just fine measuring the contributions of the workers. The machine was untiring and uncomplaining. Valued for speed and obedience, it was quantifiable and controllable. In this context, man was the imperfect machine, laboring to keep pace with metal; both were measured against the clock. Which proved to be a better laborer was determined by which put out more in less time for less resources invested. And that was called industrial productivity.

I do not mean to imply that ideas were not valued in the industrial age, only that ideas — information management, movement, storage, processing and retrieval — were valued in very few people. Smart workers did not necessarily produce more pins. So the mind was almost entirely ignored.

Today it is mind and not body that sits at the core of economy. Information is the currency or, as sociologist Daniel Bell would say, the "strategic resource." How well people understand is critical to the means of production. Knowledge workers are asked to inquire, to think, to gather information, and then to evaluate it, transform it, act upon it and communicate it.

Where indistinguishability of the work force powered the factory, individuality drives the new office. But how can we impartially measure the productivity of the mind, the impact of an idea, the value of a thought?

Clearly an idea is not like a cord of wood that burns predictably at so many calories per minute, because not all ideas are alike. To offer two ideas an hour may not be better than offering two a day or one a month. Chester Carlson, the inventor of xerography, proved the point. One idea in his lifetime was enough to create one of the world's largest industries.

In fact, the difficulty in measuring the value of a single idea or the productivity of the office worker has stifled automation in the workplace. How can the creative contributions, ideas and insights of office workers be automated?

#### Driven by information

In the manufacturing process, office functions were not considered integral, and therefore they counted as overhead. And since they were "only" overhead, the factory concentrated upon automating the profit-producing assembly line, not the office.

This task often fell to outside entrepreneurs — Christopher Latham Sholes, for one, who patented the first commercial typewriter in 1868. Thus, automating the office naturally concentrated on what was common to all offices — not just the office work in a specific industry or specific department. In essence, early office automation meant automating how paper was produced.

The irony is that what is helping us dispense with the outdated machine model is itself a machine — the computer.

Computers enable us to transcend

> ”
>
> ***Managers may prefer to operate their offices like factories because of the comfort implied in the predictability of the factory organization.***

To free ourselves from the constraints of the factory civilization, therefore, we must organize the office around the flow of information, not around the flow of paper.

#### Flexibility

In an office driven by information, secretaries do not need to be near their bosses. Aides can be in the next room or they can be in the next country. We find new flexibility in office planning, because ideas are not restricted by location. Two people do not need to be near one another to improve a product that they can flash electronically around the globe in seconds.

If the office is organized around information flow ("inflow"), then the office worker can be viewed as enriching data while it flows through the organization. In effect, each office worker works as a kind of value-added reseller of information, taking it in, massaging it and passing it along.

Information flow in the office, however, is decidedly different from product flow in the factory. In the factory, every step of the production process was orchestrated like a massive symphony with each voice being heard at just the right moment.

Nothing in the manufacturing process was left to chance — or the serendipitous result of accident. The assembly line minimized chance, straining to overcome the individuality of craftsmen and the unpredictability of the seasons. Engineers hammered out every detail of production. So many bolts of fabric arrived at the stitcher no sooner — no later — than the mechanically ordained time.

In fact, the assembly line was a machine itself — a great mechanical beast nurtured in the minds of industrialists and engineers.

The machine was to be perfect,

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minimizing waste, maximizing profit. There was little margin for error; there was no room for surprises.

#### Serial vs. parallel

The entire effect of this great machine belching forth product was, for the most part, a serially organized process in which each element of the process was anticipated and accounted for.

But not so for the office. Knowledge workers thrive on spontaneity, flexibility. In the office, people share ideas, exchange information. Staff members go off in different directions to contemplate the particular problems that confront an economic engine that today runs with nearly three quarters of its work force in the service — not manufacturing — sector.

In fact, according to Malcolm S. Forbes, editor in chief of *Forbes* magazine, "Eighty percent of America's managerial and specialized professional employees are in service jobs — computers, legal, financial, health, insurance and so on."

Managers may prefer to operate their offices like factories because of the comfort implied in the predictability of the factory organization. In reality, though, people come up with creative thoughts as they have them, not as they are directed. These ideas can be encouraged, but they certainly cannot be orchestrated.

In addition, the products of today's office are not off-the-shelf solutions to clients' problems. Most companies pride themselves on customized approaches, on knowing how to get out of the tight spots with specialized expertise.

Therefore, in the office, pieces of the puzzle are acted upon simultaneously. People do not operate like machines; they tend to process information and assignments in parallel, interleaving bits of one problem with pieces of solutions to another. A study by psychologists reported in *The New York Times*, for example, shows that chief executive officers consider several alternatives simultaneously and do not make decisions in a serial, structured way.

A well-oiled office, therefore, is flexible where the factory was ordered, spontaneous where the factory was planned, parallel where the factory processed serially (see chart page 103).

#### New type of fuel

It took centuries to move from the agricultural into the industrial age. We moved from the industrial into the information age in decades.

In the agricultural age, time was cyclical. In the industrial age, time was linear — to "make time," we worked faster, expediting the process as best we could. In the information age, we multiplex time, accomplishing two or more things simultaneously.

In the agricultural age, the key transforming resource was sunlight: free, abundant, but unpredictable. In the industrial age, the key transforming resource was processed energy: cheap, plentiful, predictable. In the information age, the transforming resource is synergy, sharing resources and ideas to work toward solutions.

In the agricultural age, the strategic resource was raw material: seed, soil and water. In the industrial age, the strategic resource was capital used to build massive factories and assembly lines. In the information age, the strategic resource is the mind: ideas that fuel the economy.

The very nature of the "products" of the office of the future — ideas and information — holds vast promise for the development of companies in the coming decades: Information is a nondepletable resource. Sharing it does not diminish it; in fact, for the first time in history, the basis of our economic strength actually increases with use. As more people share ideas and information, we're all better off.

The rise of the new currency of ideas prompted authors John Naisbitt and Patricia Aburdene to suggest in *Re-inventing the Corporation* (Warner Books, New York, 1985) that the new labor force requires what might be called "through-life education."

To stay on top of their jobs, workers continuously need new information and the opportunity to sharpen their skills.

The consequence, note the authors, is a new alliance between business and education, with the corporation undertaking a larger share of lifetime learning. They write the following:

"*Today's educational system . . . was never meant to serve the needs of today's information society; it was custom made to fit the industrial society — a time when it made sense to treat everyone the same. Uniformity, control, centralization in the factory and in management were the ideals of industrial society. . . . Individuality, creativity, the ability to think for one's self — the values we treasure now — were hardly considered assets on the assembly line or even in the executive suite.*"

Since people — not machines — have ideas, it is people, in the new office society, who ought to be valued as the economic resource.

Enlightened organizations value their workers. As Harvard Business School Professor Robert H. Hayes suggests in a *New York Times* editorial (April 20, 1986): "In such organizations, everybody is assumed to be responsible for the organization's prosperity. Its success rests on its ability to exploit opportunities as they arise, its ingenuity, its capacity to learn, its determination and its persistence."

Companies often protect capital equipment with maintenance contracts, preventive maintenance pro-

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#### Responsiveness

The introduction of new, faster technology into the workplace has enabled factories to produce more in less time. And as time in the information age becomes multiplexed — as more and more begins happening at once — response time to stimuli becomes critical.

Just as temperature sensors indicate a buildup of heat in a nuclear reactor, so marketing sensors indicate a buildup of heat in the competitive marketplace, and companies need to respond quickly. Cycling memoranda up and back through a dense corporate hierarchy no longer yields answers soon enough when critical deadlines are set in terms of days or minutes instead of months or years.

In response to the quickened pace of technology and decision making, companies have streamlined the corporate ladder and shifted authority to a larger portion of the work force.

Thus, in situations where the office is styled after the factory model, corporations tend to have steep, pyramidal hierarchies.

In contrast, information age companies such as Intel Corp. and Apple Computer and the new artificial intelligence concerns housed in Boston's "AI row" tend to have flat organizational structures.

The desire or the necessity in the new office to process information in parallel to a large degree determines the steepness of the organizational chart. The farther we move away from the factory model, the closer we move toward the empowerment of all employees and the diminution of central authority.

According to Peter F. Drucker, in a column for *The Wall Street Journal*, June 4, 1985: "Traditional organization basically rests on command authority. The flow is from the top down. Information-based organizations rest on responsibility. The flow is circular: from the bottom up and then down again." When one large multinational company organized itself around information, it was able to delete 12 levels of unnecessary management.

Empowerment delegates to employees both responsibility and authority to act in particular circumstances. Employees on the line, in the best position to know what is going on, handle day-to-day decisions effectively and cost-efficiently.

Such delegation frees top management for other managerial chores and accords to jobs at all levels the chance-

the ability, power and resources to exercise control over their own job responsibilities.

#### Instruction-directed systems

It may seem that computers are the catalysts in the transformation from the industrial to the information age. That is true — indirectly. But the real engines of change are the instruction-directed systems — the software that drives computers and other equipment.

Without software or programs to run, the fastest, state-of-the-art supercomputer serves as little more than a costly silicon or gallium arsenide boat anchor.

But the roots of change reach deeper and wider still.

Two revolutions run parallel in our information age: the computer revolution and the genetic engineering revolution. Many view them as separate, but the basis for each is information.

Many biologists consider

> ***Wall Street politely says the industry is "experiencing a contraction." But the office revolution is not simply slowing down. It seeks a new, firmer footing, one grounded in a new perception of what office work is.***

organisms to be nothing but clothing for naked DNA, the genetic material of all cells. All instructions for developing an organism are contained in the brief genetic code formed from four fundamental nucleic acids.

Ultimately the future may point to the merger of man and machine. At the simplest level, this means that machines may have some intellectual attributes of man — the "thinking machines" expected by scientist Allan Turing by the year 2000.

At the highest level, microchip circuitry may be biologically based. A Dec. 31, 1984, *U.S. News & World Report* article proclaimed: "Visionary researchers are pursuing a tantalizing goal: to devise an electronic chip from organic products." These scientists will try to base new machines on self-replicating computer chips.

Already, research facilities such as AT&T Bell Laboratories seek to employ the structural properties of DNA, RNA and other proteins to serve as memory chips and switching devices for biologically based computer systems.

Science fiction writers envision that a new breed of man will emerge if and when the reverse comes true: Human minds incorporate computer capabilities.

#### Expert systems

In some ways, we may be ahead of Turing's schedule. Medicine in particular embraces artificial intelligence software, in the form of expert systems, as computerized aides. Because of their utility, expert systems also have invaded the robotized factory, the financial analyst's office and elsewhere.

The value of expert systems is twofold. First, they extend man's memory and speed. Second, artificial intelligence allows machines to work more the way people do. Machines can accommodate man instead of man accommodating machines.

Though the computer is the most recent installment of this marriage of man and machines, it is neither the last nor the most effective. The computer is helping us automate our work, reducing the time and tedium of doing repetitive tasks. It may go further in liberating us, helping us develop mechanical servants that speak, hear and ultimately understand.

This is why the computer plays such a unique and pivotal role in the development of the office and why it has been embraced and heralded as the messenger of a new age.

But in a sense, it is a case of mistaken identity. It is not that the computer is responsible for the new age, but rather that the computer allows us to break with an established and restrictive factory civilization.

We probably would have gone on praising the computer and its impact on the way we work had not the new age stumbled. Wall Street politely says the industry is "experiencing a contraction."

But the office revolution is not simply slowing down. It seeks a new, firmer footing, one grounded in a new perception of what office work is.

#### Machines that mimic people

In the information age, the computer has become an accessory to people, compared with the industrial age model of people as accessories to the machine. A long-standing conflict between man and machine has been who mimics whom.

With computers, we have some of the first instruments capable of working the way we do. In the office, executives spend more than 90% of their time communicating over the phone or at meetings. With digitized voice recognition and voice synthesis systems, computers, too, can be spoken to and listened to.

And, when artificially intelligent computers become commonplace, computers also will understand and do our bidding — by listening, not by our typing in commands.

In the realm of voice, our need to communicate orally pushed the development of the telephone over the telegraph. Had the telephone not amplified a convenient way of communicating, it would not have spawned a multibillion-dollar industry. People adopted the telephone because the telephone adapted to our way of working.

Currently, many executives will not engage computers productively, because computers do not bend to executives' ways of working.

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## **In Depth**/Taking the Factory out of the Office

### Factory vs. office: Distinguishing features in work flow and organization

| Factory | Office |
|---|---|
| Serial processing | *Parallel processing* |
| Physical space | *Conceptual space* |
| Preplanned | *Spontaneous* |
| Ordered | *Flexible* |
| Linear time | *Multiplexed* |
| Depletable resources | *Nondepletable resources* |
| Speedy processes | *Customized processes* |
| Quantity | *Quality* |
| Automated machinery | *Intelligent machinery* |
| Durable goods | *Disposable goods* |
| Steep pyramid office hierarchy | *Flat hierarchy* |
| Workers indistinguishable | *Individuality* |
| Central control | *Empowerment* |
| Productivity | *Effectiveness* |
| Processed energy | *Mental energy* |
| Accounting | *Valuing* |
| Specialization | *Conceptualization* |

**Modern offices are characterized by elements basically different from those of factories, yet many offices continue to function like highly automated paper factories.**

the tool, that should be important. Powered by artificial intelligence, computers can become the kind of executive aide about which today's managers dream but generally get along without.

Contrary as it may seem, therefore, the organization of offices and office work is not driven by technology. New technologies will simply allow us to be more of who we are.

#### Six levels of understanding

What organizes the office then? Information flow.

Examination of office work demonstrates that people, to varying degrees depending upon job function, must be capable and efficient at one of six levels of "apprehension" — not in the sense of fear but in terms of perception of ideas.

A secretary, for example, does not merely answer the phone and take dictation. A secretary screens information: Is this call important? Should the executive be interrupted? Does the manager need this memo to make a decision?

A product manager evaluates a broad number of signals each day to make intelligent decisions. In announcing a new product, for example, a manager must collect information about the competition. What are they offering now and at what price? Can we beat it? What is the maximum number of units to be manufactured based on incomplete market surveys?

As we advance to executive levels, the strain of collecting and evaluating information rises exponentially. How, for example, will the national debt affect interest rates within one week, two months, five years? How does this affect plans for expansion, here and overseas? Will the political unrest in the Middle East jeopardize low oil prices?

In *The Cult of Information* (Pantheon Books, New York, 1986), technology critic Theodore Roszak warns that our fixation with the computer causes us to confuse "data" with general confusion about how we apprehend the world and what precisely we do when we "manage information."

Over the centuries, individuals have tried to order human levels of understanding. Futurist Wilford Lewis conceived one such hierarchy, a version of which, shown below, models how work performed in an office — regardless of position or job title — requires processing at one or more of these levels of apprehension:

1. **Data** — unconnected numbers, dates, names and items that flood us daily. They can be seismic readings or even daily Dow Jones figures alone (unconnected to dates). Albany, macaw and 1776 are data.

2. **Facts** — connected data. When we combine daily Dow Jones quotes with dates we can obtain a picture. Albany is the capital of New York, a macaw is a bird and the American Revolution occurred in 1776 are examples of facts.

3. **Knowledge** — a particular assemblage of facts, providing firmer connective tissue among them. Knowledge can be taught; it can be acquired by going to school, where a student gains perspective on a range of issues related to a field of study. However, having knowledge of all parts of an engine does not, for example, guarantee that a mechanic can repair a car.

4. **Experience** — primarily gained from self-directed interactions with the real world. Experience broadens knowledge and gives it a richness unavailable through study alone. Experience internalizes knowledge; it takes time to acquire.

5. **Shared visions** — philosophical and emotional collective understandings founded in our universality, not our individuality. It is the stuff of leaders — people who are able to perceive the common denominator, the universal need. It is the motivating force that galvanizes organizations into action and gives them purpose.

6. **[illegible]** — a level of appre-

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understanding that comes to an individual rarely and in great flashes — a creative brilliance that sees beyond the immediate boundaries and strikes, as novelist Graham Greene says, "at the heart of the matter."

#### Moving to a higher level

Each of these levels of apprehension is transformed into a higher level by application of an organizing principle. Data becomes fact with order or association. Facts elevate to knowledge with synthesis. Knowledge transforms into experience with perspective. Shared vision transcends experience by application of a single unifying force or view of underlying principles. Epiphanies demand a supralogic to bring new insights into focus often without appeal to reason.

> *Powered by AI, computers can become the kind of executive aide about which today's managers dream but generally get along without.*

It is the application of the organizing principle that demonstrates our skill. And it is the level of apprehension exercised at our job that primarily determines our function and status within an organization.

Individuals who collect and key data for medical forms or insurance claims, for example, require a low level of apprehension. Their interactions with other departments are limited, and training levels may be low. At peak times, hourly rated part-time employees may come in to augment the staff with little or no transition time.

On the other hand, individuals with experience bring higher levels of apprehension to the employer. Corporations often purposefully hire experienced individuals away from competitors.

The same is true of corporations. Leveraged buy-outs and purchases of critical suppliers by larger companies exemplify the accumulation of hard-earned, easier bought experience.

It seems the office, like the farm and factory before it, is a microcosm — a laboratory for new ideas and new technologies, for observing and in some cases controlling social, economic and philosophical changes. In the office, we can observe the world in transition.

Often, indications of change show first in our language, which early on accommodates the pressures of new technology. New words include "software," "robots," "expert systems," "RAM chips," even "user-friendly" to indicate machines taking halting steps toward working the way people do.

But most important for us, and for the economic well-being of the nation, the transition from factory to office is starting to reorganize the way we work. What the conflicts and upheavals in the office are suggesting today is that we need a new language to express our new perceptions of the forces at play.

#### A new language for a new age

Industrialists invented the language of the machine: "rate," "efficiency," "productivity," "specialization," "delegation," "accounting."

Perhaps the new language should eschew concepts such as depreciation that compensate for how much less value our assets represent as time goes on. Instead, we might apply appreciation factors to our real assets — our people — based on years of experience and increased levels of apprehension.

Wilford Lewis suggests alternatives that also reflect the new reorganization of the office. According to Lewis, we should speak not of productivity but of creative synthesis, not of physical space but of conceptual space, not of accounting but of valuing and not of processed energy but of mental energy. In this age of information management, we must redefine our concepts to recognize that a strong mind, not a strong back, rests at the root of our economic power.

People form the core of our economic wealth; they are the means of production. In the industrial age, people aided machines; today machines aid people. This shift is central to the most dramatic change in the history of production.

If we view the strategic and transforming resources of prior ages to be external to man, this is the first time in history that the strategic and transforming resources are internal and nondepletable: the human mind. We are no longer separated from the means of production. We are it.

In this new age, what should be most valued is the uniqueness of our knowledge workers and not the fact that they are replaceable cogs in the wheel of progress. Soon, when the mind is truly valued as the means of

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# MANAGEMENT

**TAKING CHARGE**
Roy N. Freed

## Hiring lawyers: Caveat emptor

Businessmen must be alert to promotional legal hype by computer and high-tech lawyers as competition for clients heats up. For example, a lawyer admitted to practice in 1962 is reported to claim 25 years experience as a computer lawyer. Another lawyer is quoted as asserting in 1986 that he has just become "the nation's first information law attorney."

Unfortunately, it is no solution to select such legal help based solely on the prestige of a specific law firm. Lawyers must be chosen individually, with much care. The failure to do a proper job is an abdication of an executive's responsibility to his company.

Companies might need computer lawyers for a variety of matters: structuring sales, leases or licenses of computer equipment or software; establishing ownership of software, which is becoming increasingly valuable; minimizing taxes; and avoiding liability for harm from the use of computers. Poor legal advice on these matters can lead companies to spend money needlessly on avoidable contract disputes, to pay taxes not really due and to cover excessive liabilities or miss such coverage. Companies also might lose valuable property rights to which they are entitled, especially in software.

The legal problems of companies arise largely through a failure to recognize the true nature of transactions and other matters for legal purposes rather than sheer ignorance of the law. Many businessmen and lawyers tend to be-

See **HIRING** page 113

*Freed practices computer law in Boston with the firm of Brown, Rudnick, Freed and Gesmer.*

## Weyerhaeuser branches out

### Wood products giant sells in-house software, services

**By David A. Ludlum**

TACOMA, Wash. — The Weyerhaeuser Co., struggling against more diversified competitors with lower labor costs, hopes to harvest profits from its information systems unit by selling software and services to others.

Last year, Weyerhaeuser Information Systems (WIS), an in-house operation for 25 years of the wood products giant, began experimenting with outside sales. Since the beginning of this year it has operated as a profit center.

Top managers of the information systems unit have found that the move required something of a cultural revolution, with the importance of technological prowess taking a back seat to market savvy. "It's not necessarily whiz-bang technology but meeting customer needs; that's the change that you have to undergo," said Gary Crowell, the unit's director of marketing and new prodcuts.

So far, the results have been less than expected, but managers say they are still optimistic about the longer term.

WIS is selling minicomputer and mainframe software for manufacturing maintenance and tracking workers' compensation claims, both developed for in-house use, as well as a personal computer program that manages data on truck and rail rates.

WIS also offers disaster-recovery consulting and services, including a hot site with hardware from four vendors for maintaining critical operations. In the Northwest, WIS provides other services such as system planning and building, consulting in various areas, including telecommunications, and educational programs.

Weyerhaeuser, which lost the top spot in the forest products industry to Georgia-Pacific Corp. about 10 years ago, saw its net income fall 11.5% last year to $200.1 million. Revenue dipped to $5.2 billion from $5.5 billion in 1984.

The company, the major player in the wood products industry in the Northwest since 1900, owns six million acres of timberland, an area eight times the size of Rhode Island. In recent years, however, it has lost ground to Southern and Canadian

See **WEYERHAEUSER** page 112

## Putting users to work (for you)

**By David A. Ludlum**

CAMBRIDGE, Mass. — After studying dispersed computer systems for more than 30 corporate sponsors, a partnership of consulting firms recommends information systems departments become more flexible to accommodate the systems' users.

"They have to adapt to a whole new environment that doesn't necessarily have the information systems function as the center of the computing universe," said Thomas Davenport, managing associate of Index Systems, Inc. In Cambridge, commenting on research his firm did with Hammer and Co., also of Cambridge.

Information systems managers worried about losing influence must look at that influence in new terms, Davenport said. "It's not just how many computers do you own or how many people do you have working for you, but what kind of impact does your presence have on the business," he said.

Through their Partnership for Research in Information Systems Management, the consulting firms studied 20 corporate departmental and work group computer systems put in place at the initiative of the users rather than the central information services unit. Half of the systems were developed in partnership with an information services unit.

The partnership and its research was sponsored by 34 major corporations, including Aetna Life and Casualty Co., Coca-Cola Co., Colgate-Palmolive Co. and Rockwell International Corp. Leaders of the research discussed the results at a press conference.

The study found strong or very strong demand for dispersed computer systems among 80% of the sponsors, with three-

See **PUTTING** page 114

**INSIDE**

Managers on the Move: Grumman Data Systems head to succeed corporate president/**106**

Calendar: Conferences, shows, seminars/**110**

**INSTANT ANALYSIS**

*"Progressive information systems managers realized that end-user computing was going to happen with them or without them. And of course the smart thing to do when something is inevitable is not to fight it but to facilitate making it happen and take credit for it."*

**— James C. Wetherbe, director of the MIS Research Center and professor of MIS at the University of Minnesota**

## Raider of the lost Mark: Reclaiming a 1950 computer

### Million-dollar Mark III was pushed out window

**By Eddy Goldberg**

BLACKSBURG, Va. — In January 1950, a million-dollar computer made the cover of *Time* magazine with the caption, "Mark III: Can Man Build Superman?" Six years later, the Mark III was unceremoniously dumped out of a second-floor window at the Naval Proving Ground in Dahlgren, Va., sold as scrap for $60 and remained lost to the world for 30 years.

"No one knew what had happened to the Mark III," said Dr. John A. N. Lee, a professor of computer science [illegible] of the Association of Computing Machinery. In early 1985, Lee tracked the computer to a farm near Fredericksburg, Va., by finding the daughter of Bill Slusher, the man who had bought it as scrap. Slusher, a computer operator at the Naval Lab, was an amateur radio and television hobbyist who used some of the parts, sold others and finally dumped the remains down the side of a hill, where they lay until Lee found them last year.

So far, Lee has found magnetic tape drives, two memory drums, relays, vacuum tubes, trays of components and a lot of cabling. He said the components are in surprisingly good condition, considering they have [illegible] for identification, eight still work.

The Mark III was the third in a series of four computers built at Harvard University under the guidance of Howard Aiken. Completed in September 1949, it was delivered to the Navy in March 1950 for ballistics calculations. The million-dollar computer combined electronic and electromechanical technology and contained more than 5,000 vacuum tubes and 2,000 relays.

Lee called it a "typical monster that pretty well filled the room" in which it was housed, which was about 50- to 60-feet long and 30- to 40-feet wide. In fact, the Mark III was so big that, during construction of the Naval facility that housed the [illegible] ered. Lee said IBM's subsequent insistence that modules for its computers be designed to fit through standard doors and elevators might have arisen from incidents like this.

With a total data storage of 4,350 16-bit numbers, the Mark III had one of the largest memories of its time. It was the first computer to have magnetic drum memory, consisting of ferrous-oxide-coated cylinders that were the forerunners of the magnetic memory disks used today. Lee compared them to Edison's first phonograph, which used cylinders that were later replaced by flat phonograph records.

However, the Mark III reportedly suffered from reliability problems

## MANAGEMENT

### MANAGERS ON THE MOVE

**John O'Brien**, president of the Data Systems Division at Grumman Corp., based in Bethpage, N.Y., has been appointed executive vice-president of Grumman and is expected to become president of the company on Aug. 1.

John O'Brien

O'Brien is expected to succeed Grumman President George M. Skurla, who reaches the mandatory retirement age of 65 in July, the company said in a statement. Securities analysts have speculated O'Brien would then be in line to succeed Grumman Chairman John Bierwirth, who is 62.

O'Brien, 55, joined Grumman as a flight-test analyst in 1954 and was executive vice-president of the company's Grumman Aerospace subsidiary before being appointed president of the Data Systems Division.

In recent years Grumman has become more involved with defense electronics as well as computer services, areas that O'Brien has indicated he would stress. He could not be reached for commment.

In a statement, Bierwirth said that "John O'Brien's extensive experience in the aerospace business and his leadership in setting Data Systems on a path of sales and earnings growth make him well qualified to lead Grumman during the coming years of change and growth."

O'Brien is succeeded by **Robert J. Myers**, senior vice-president and head of Grumman's Services Division, which provides legal and administrative services to the corporation. Myers was previously with Grumman Aerospace.

Grumman Data Systems Division, which began as an internal corporate operation, is a large-scale systems integrator whose specialties include government defense work, engineering and scientific systems and manufacturing.

The Data Systems Division is also involved with data base publishing, systems maintenance and education. It was formed as a subsidiary in 1970 and became a division through a restructuring of the company last year.

With 38 offices nationwide and about 2,800 employees, the Data Systems Division accounted for about $245 million of Grumman's $3 billion in revenue last year. The Data Systems Division is considered profitable and growing.

"It's doing well. It stands out in a sense that it is profitable, whereas many other defense firms' data systems subsidiaries are not," said Wolfgang Demisch, a defense industry analyst with First Boston Corp.

Wayne Glenny

■

**Wayne R. Glenny** has joined the Bionetics Corp. of Hampton, Va., as vice-president of administrative services. Among other duties, he will be responsible for management information systems. Bionetics and its subsidiary, Mercury Consolidated, Inc., provide a range of technical services to the federal government and private industry.

■

**Arthur L. Kern Jr.** has been appointed director of management information systems with Philips Industries, Inc. in Dayton, Ohio. Kern previously served in several positions at NL Industries, Inc. in Houston, most recently as manager of consulting services.

■

**G. Geoffrey Wood** has been named systems development consultant in the data services department of the U.S. branch of Zurich Insurance Co., a member of the Zurich-American Insurance Group of Schaumburg, Ill. Wood is responsible for integrating premium and loss statistical data for management reporting purposes.

■

**Tina M. Kern** has been promoted to personal computer support specialist at Keller-Crescent Co., an Evansville, Ind., advertising agency.

■

Appleton Papers Inc. of Appleton, Wis., has restructured its information services department. Vice-President John L. Tucker said the change provides for specialization and additional management. It reflects the creation of a new data center and use of a new IBM mainframe, he added.

**Richard H. Duchaine**, formerly manager of management information systems, has been named director of information services. **Kathleen S. Coles**, formerly staff analyst/programmer, has been promoted to manager of planning and administration. **Dennis L. Riley** has been hired as manager of major systems development. **Daniel L. Kopetsky** has been hired as manager of telecommunications and personal computing. All four report to Tucker.

Also hired was **Calvin A. Frederickson**, manager of computer operations. **Robert T. Reilly**, former manager of developmental systems, and **James C. Novak**, former manager of developmental systems/central applications, have been promoted to managers of systems development and production support.

**Bert L. Wiegund**, former project leader/technical support, was promoted to manager of data base administration and development support. **Christopher C. Wyman**, former manager of data processing opera-

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## MANAGEMENT

### CALENDAR

### WEEK OF JUNE 22

JUNE 22-27, PHILADELPHIA — **Management Information Systems for Strategic Advantage.** Contact: The Registrar, Office of Executive Education, 200 Vance Hall, The Wharton School of the University of Pennsylvania, Philadelphia, Pa. 19104.

JUNE 23-24, NEW YORK — **Applying Information Technology for Competitive Advantage.** Contact: Frank Lesh, Information Management Perspective, Inc., Suite 208, 5 Elm Row, New Brunswick, N.J. 08901.

JUNE 23-25, ALBUQUERQUE, N.M. — **Integrated Fiber-Optic Technology Training.** Contact: Linda Castle, Optoelectronic System Consultants, P.O. Box 35525, Albuquerque, N.M. 87176.

JUNE 23-25, MIAMI — **Electronic Data Processing Auditors Association 14th Annual International Conference.** Contact: EDPAA, P.O. Box 88180, Carol Stream, Ill. 60188.

JUNE 23-26, BOSTON — **ATE East '86.** Contact: Registrar, Morgan-Grampian Expositions Group, 1050 Commonwealth Ave., Boston, Mass. 02215.

JUNE 23-26, BOSTON — **Pick/Basic Programming Workshop for Beginning Pick Programmers.** Contact: Pick System Educational Series, JES & Associates, P.O. Box 19274, Irvine, Calif. 92713.

JUNE 23-27, AMSTERDAM — **Fourth Annual European Fiber-Optic Communications and Local-Area Networks Exposition.** Contact: Cheryl MacDonald, Information Gatekeepers, 214 Harvard Ave., Boston, Mass. 02134.

JUNE 23-27, CAMBRIDGE, MASS. — **Managerial Planning for the Security and Privacy of Contemporary Computer and Telecommunications Systems.** Contact: Prof. Gary Marx, Department of Urban Studies and Planning, MIT, 77 Massachusetts Ave., Cambridge, Mass. 02139.

JUNE 23-27, CHICAGO — **A/E/C Systems '86: The Computer and Management Show for the Design and Construction Industry.** Contact: Conference Director, A/E/C Systems '86, P.O. Box 11318, Newington, Conn. 06111.

JUNE 24-26, CHICAGO — **Structured Techniques Association III/Structured Techniques in the Eighties: Practice and Prospects.** Contact: Mary Anne Gabriel, Heller Financial Corp., 105 W. Adams St., Chicago, Ill. 60603.

JUNE 24-27, CHICAGO — **Autocad Expo '86.** Contact: William Ryan, Autocad Expo '86, Autodesk, Inc., 2320 Marinship Way, Sausalito, Calif. 94965.

JUNE 24-27, SAUSALITO, CALIF. — **Autocad Expo '86.** Contact: Autocad Expo '86, 2320 Marinship Way, Sausalito, Calif. 94965.

JUNE 25, CHICAGO — **International Facility Management Association's Computer Applications for Facility Management.** Contact: IFMA, Suite 1410, 11 Greenway Plaza, Houston, Texas 77046.

JUNE 25, NEW YORK — **Regression Testing of CICS Applications.** Contact: Teltech CICS Users Group, Telecommunications Technology Corp., 39 Broadway, New York, N.Y. 10006.

JUNE 25, SAN FRANCISCO — **NATA — West.** Contact: Karen Palermo, North American Telecommunications Association, 2000 M St. N.W., Washington. D.C. 20036.

JUNE 25-26, COATESVILLE, PA. — **Chester County Expo '86: CAD/CAM Conference from Micro to Mini.** Contact: Lee Smith, Central Chester County Vocational Technical School, 1635 E. Lincoln Highway, Coatesville, Pa. 19320.

JUNE 25-27, SAN FRANCISCO — **Repositioning Your Company For Snccess in a Rapidly Changing Marketplace.** Contact: Competitive Telecommunications Association, 120 Maryland Ave. N.E., Washington, D.C. 20002.

JUNE 27, BOSTON — **System Maintenance Workshop for Pick Software Maintenance Personnel.** Contact: Pick System Educational Series, JES & Associates, P.O. Box 19274, Irvine, Calif. 92713

### WEEK OF JUNE 29

JULY 2-3, LAS VEGAS — **Full Meeting of the Design Antomation Standards Subcommittee.** Contact: Ron Waxman, Design Automation Standards Subcommitee Co-Chairman, IBM FSD, 9500 Godwin Drive, Manassas, Va. 22110.

### WEEK OF JULY 6

JULY 7-9, WASHINGTON, D.C. — **Deregulated Centrex vs. PBX.** Contact: Telestrategies, Suite 100, 1355 Beverly Road, McLean, Va. 22101.

JULY 8-11, COLUMBIA, MD. — **The Technical Manager in a Changing Environment.** Contact: Continuing Education Institute, Suite 102, 21250 Califa St., Woodland Hills, Calif. 91367.

JULY 9-10, NEW YORK — **Online: The Information Connection.** Contact: The Information Systems & Technology Division of the American Management Association, 135 W. 50th St., New York, N.Y. 10020.

JULY 9-11, NEW YORK — **The Fourth Annual PC Expo.** Contact: PC Expo, P.O. Box 1026, Englewood Cliffs, N.J. 07632.

JULY 10-11, LOS ANGELES —

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Processing Management Association Seminars, Dept. KE, P.O. Box 3608, 3420 Kashiwa St., Torrance, Calif. 90510.

## WEEK OF JULY 13

JULY 13-18, CHICAGO — **Guide 65.** Contact: Guide International Corp., 111 E. Wacker Drive, Chicago, Ill. 60601.

JULY 14-17, BOSTON — **Software Trends for Executive Planning and Strategy.** Contact: Software Institute of America, Inc., 8 Windsor St., Andover, Mass. 01810.

JULY 16-18, WASHINGTON, D.C. — **SNA Architecture and Implementation Seminar.** Contact: Communications Solutions, Inc., 92 S. Saratoga-Sunnyvale Road, San Jose, Calif. 95129.

JULY 17-18, PALO ALTO, CALIF. — **CD-ROM Product Development: What Does It Take?** Contact: Information Industry Association, Suite 800, 555 New Jersey Ave. N.W., Washington, D.C. 20001.

## WEEK OF JULY 20

JULY 20-23, TORONTO — **Directions at Toronto.** Contact: Cincom Systems, Inc., 2300 Montana Ave., Cincinnati, Ohio 45211.

JULY 21-22, SAN JOSE, CALIF. — **Computer-Aided Logistics Support.** Contact: Education Foundation of the Data Processing Management Association Seminars, Dept. CALS, P.O. Box 3608, 3420 Kashiwa St., Torrance, Calif. 90510. Also being held July 24-25 in Los Angeles.

JULY 23-25, BOSTON — **Microtrends '86, Education: Redirecting the Revolution.** Contact: Bobbi Hunt, International Communications Industries Association, 3150 Spring St., Fairfax, Va. 22031.

JULY 23-25, MORRISTOWN, N.J. — **Data Communications: Fundamentals and Beyond.** Contact: The American Institute, Carnegie Building, 55 Main St., Madison, N.J. 07940. Also being held July 30 to August 1 in Los Angeles; August 6-8 in Anchorage, Alaska, and August 13-15 in Boston.

JULY 24-25, ATLANTIC CITY — **Integrated Logistics Support.** Contact: TTS Seminars, c/o Technology Training Corp., Dept. ILS/LSA, P.O. Box 3608, 3420 Kashiwa St., Torrance, Calif. 90510. Also being held July 28-29 in Orlando, Fla., and July 31 to August 1 in Washington, D.C.

JULY 24-25, SAN FRANCISCO — **Advanced Communications Architectures Seminar.** Contact: Communications Solutions, Inc., 992 S. Saratoga-Sunnyvale Road, San Jose, Calif. 95129. Also being held August 19-20 in Washington, D.C.

TON, D.C. — **EDI Training Session.** Contact: TDCC, 1101 17th St. N.W., Washington, D.C. 20036. Also being held August 21-22 and September 25-26 in Arlington, Va.

## WEEK OF JULY 27

JULY 27-30, BOSTON — **Recognition Technologies Users Association Forum '86 Summer Session.** Contact: Recognition Technologies Users Association, P.O. Box 2016, Manchester Center, Vt. 05255.

JULY 27-31, ANAHEIM, CALIF. — **Third Annual Information Center Conference & Exposition.** Contact: Information Center Conference & Exposition, Weingarten Publications, Inc., 38 Chauncy St., Boston, Mass. 02111.

JULY 28-29, AVON, COLO. — **How to Manage Data and Information as a Resource.** Contact: Barnett Data Systems, 19 Orchard Way N., Rockville, Md. 20854.

JULY 28-29, BOSTON — **Fast Algorithms Seminar.** Contact: Technology Training Corp. Seminars, Dept. FA, P.O. Box 3608, 3420 Kashiwa St., Torrance, Calif. 90510. Also being held July 31 to August 1 in Orlando, Fla., and August 4-5 in Washington, D.C.

JULY 28-30, RENO, NEV. — **1986 Summer Computer Simulation Conference.** Contact: The Society for Computer Simulation, P.O. Box 17900, San Diego, Calif. 92117.

JULY 28-AUGUST 1, SAN DIEGO — **Mapper Installation, Coordination and Support.** Contact: Compumetrics Training Institute, P.O. Box 58383, Houston, Texas 77258.

JULY 28-AUGUST 1, SEATTLE — **Omnicom Week.** Contact: The Omnicom Institute, Omnicom, Inc., Suite 304, 501 Church St. N.E., Vienna, Va. 22180.

JULY 30-AUGUST 1, AVON, COLO. — **How to Build and Use a Data and Information Resource Directory.** Contact: Barnett Data Systems, 19 Orchard Way N., Rockville, Md. 20854.

## WEEK OF AUG. 3

AUGUST 4-8, ANN ARBOR, MICH. — **Contemporary Data Communication Networks: Planning, Management and Computer-Based Design.** Contact: Engineering Summer Conferences, 300 Chrysler Center/N. Campus, Ann Arbor, Mich. 48109.

AUGUST 4-8, FORT COLLINS, COLO. — **Topics in Manufacturing Systems Engineering.** Contact: National Technological University, P.O. Box 700, 601 S. H...

## WEEK OF AUG. 10

AUGUST 11-14, SNOWMASS, COLO. — **AM/FM International Ninth Annual Conference.** Contact: AM/FM International, Suite 820, 8775 E. Orchard Road, Englewood, Colo. 80111.

AUGUST 11-15, PHILADELPHIA — **AAAI-86 Fifth National Conference on Artificial Intelligence.** Contact: AAAI-86, The American Association for Artificial Intelligence, 445 Burgess Drive, Menlo Park, Calif. 94025.

AUGUST 14, ATLANTA — **Buying and Selling Rights to Software, Hardware and Services.** Contact: Data-Tech Institute, Lakeview Plaza, P.O. Box 2429, Clifton, N.J. 07015. Also being held August 15 in Philadelphia, August 18 in Boston and August 19 in Chicago.

## WEEK OF AUG. 17

AUGUST 18-22, DALLAS — **Thirteenth Annual Conference on Computer Graphics and Interactive Techniques.** Contact: SIGGRAPH '86, Conference Management, Smith, Bucklin & Associates, Inc., 111 E. Wacker Drive, Chicago, Ill. 60601.

AUGUST 18-22, WALTHAM, MASS. — **The Institute on Artificial Intelligence and Expert Systems.** Contact: Joan Merrick, Seminar Coordination Office, Suite 415, 850 Boylston St., Chestnut Hill, Mass. 02167.

AUGUST 19-20, NEW YORK — **DEC: The Next Five Years.** Contact: The Yankee Group, Seminar Division, 14th Floor, 89 Broad St., Boston, Mass. 02110.

AUGUST 19-21, PHILADELPHIA — **Second Annual Physical and Electronic Security Symposium and Exposition.** Contact: Michael C. Otten, Booz, Allen and Hamilton, Inc., 4330 East-West Highway, Bethesda, Md. 20814.

## WEEK OF AUG. 24

AUGUST 26-28, SAN MATEO, CALIF. — **Interconnect '86.** Contact: Agnes M. Pavel, Program Director, U.S. Telecommunications Suppliers Association, Suite 1618, 333 N. Michigan Ave., Chicago, Ill. 60601.

See CALENDAR page 112

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## MANAGEMENT

**CALENDAR** from page 111

### WEEK OF AUG. 31

SEPTEMBER 1-5, DUBLIN — **International Federation for Information Processing Congress '86.** Contact: International Federation for Information Processing Congress '86, 44 Northumberland Road, Dublin 4, Ireland.

SEPTEMBER 2-5, CHICAGO — **Fourth Annual Office Automation Society International Conference.** Contact: Sue Pickard, OASI, Suite B, 15269 Mimosa Trail, Dumfries, Va. 22026.

SEPTEMBER 3-5, LOS ANGELES — **Telemarketing/West.** Contact: Doug Shreve, The Telemarketing Foundation, Inc., P.O. Box 829, Arnold, Md. 21012.

### WEEK OF SEPT. 7

SEPTEMBER 8-10, PHILADELPHIA — NCC — **Telecommunications Conference.** Contact: NCC-Telecommunications, American Federation of Information Processing Societies, 1899 Preston White Drive, Reston, Va. 22091.

SEPTEMBER 8-18, MONTREAL — **43rd FID Conference and Congress.** Contact: FID 43rd Conference and Congress, C.P. 1144, Succursale Place Desjardins, Montreal, Que., Canada H5B 1B3.

SEPTEMBER 9-12, ANTWERP, BELGIUM — Second European Simulation Congress. Contact: The Society for Computer Simulation, c/o Ghislain C. Vansteenkiste, University of Ghent, Coupure Links 653, B-9000 Ghent, Belgium.

# Reclaiming the lost Mark III

From page 105

to the repeated heating and cooling when the machine was switched off over the weekend.

In 1956, it was replaced by an IBM Naval Ordinance Research Computer (NORC). The NORC was the supercomputer of its time, according to Lee, who is also on the editorial board of the *Annals of the History of Computing* of the American Federation of Information Processing Societies (AFIPS).

Lee says that the recovery of the Mark III is only partly completed and that he has a problem: The new owner of the property wants to build a house near the Mark III site this coming fall.

"If we don't get it out by fall, it will almost certainly be covered over or hauled off to another dump," he said.

Lee has been joined by two computer science faculty members from nearby Mary Washington College in Fredericksburg, Va., and he has also received a $1,000 grant for his project from AFIPS.

#### May not be in time

But he is still concerned that doing this time-consuming job on weekends and odd evenings at his own expense will not be fast enough to save the Mark III.

Even if he succeeds, he does not know where he would put the pieces. The Mark I and Mark II are in the Smithsonian Institution, which reportedly cannot take the Mark III but is considering the creation of a display at the site, Lee said.

He also contacted The Computer Museum in Boston, which he said is interested in acquiring some of the parts.

# Weyerhaeuser branches out

From page 105

operations, many of which have cheaper, nonunion labor.

The move to generate profits from information technology stemmed in part from a drive to improve in-house services through greater local autonomy, according to Frank Guthrie, general manager of WIS.

"We recognized that we had unique skills and resources and that we could do a better job if we were to operate in a business context rather than a staff organization," Guthrie said. The view was shared by the executive vice-president who oversees WIS and other top managers, he added.

The drive for efficiency has resulted in a noticeable reduction in costs, he said. "Now we have to have a customer for everything we do. We have to understand why we are doing something," Guthrie said.

#### Plans for revenue from outside sales

On the income side, WIS, which charges Weyerhaeuser users, plans to get about 10% of its revenue for this year from outside sales, Guthrie said. That is less than called for in initial projections, which Guthrie now calls overly aggressive. "We are lagging our growth curve, but the growth is there. It's probably at a logical rate, as best as one can expect," he said.

WIS has moved to market-based pricing. "It's hard to get it in your mind that you're not figuring out what it cost," Guthrie said.

The information systems unit, which employs about 400 people, plans to meet its initial goal of breaking even this year or to "go down trying," but it has plans to move well beyond breaking even next year, according to Guthrie.

Looking further ahead, WIS aims to generate 50% of its revenue from outside sales within five years, Guthrie said. He declined to discuss future

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**Issue: August 20 - Closing: July 11**

COMPUTERWORLD FOCUS

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# Hiring lawyers: Caveat emptor

From page 105

lieve incorrectly that computer technology creates new legal issues because the technology is novel and complex. That misperception is fostered in part by the technical jargon used by computer specialists.

Actually, computers generally are used to do things people have been doing all along, such as bookkeeping, controlling inventory and processing transactions. Hence, computer functions are not novel for most legal purposes; existing laws apply to them, with wise interpretation. It is diversionary and needlessly costly to advocate new laws tailored specially for computer subject matter; the real challenge for businessmen and lawyers is to see how computer uses and transactions might be covered by existing laws.

That frequently requires the ability to discover broader scopes in some existing laws than were recognized before computers existed. For example, integrated circuit chip elements called "read-only memories" are as copyrightable as books because their functions are similar, not because of the words in a statute.

Businessmen need the same protection for transactions and functions involving computers that they needed for those matters before computers were applied to them. For example, they must get ownership of properties created at their expense, particularly software. That requires an understanding of what the software comprises for legal purposes, which might involve copyrights, trade secrets, patents or items of tangible personal property.

Selecting the correct type of property interest is essential for determining proper tax treatments of expenditures to create or acquire the software and income from marketing it and also possible liabilities to persons who suffer harm from its use.

> *The real challenge is to see how computer uses and transactions might be covered by existing laws.*

Liability becomes increasingly significant as computers are used in functions from which harm might result, such as operating factories and machine tools, conducting bank transactions, controlling aircraft and performing medical operations. Businessmen must even know how software can be involved as collateral security for their companies' loans. Again, it is necessary to know exactly what types of property interests are involved.

Businessmen must find lawyers who first and foremost can understand the factual aspects of computer transactions and properties for legal purposes. Of course, the lawyers also must have the basic ability to identify the wide variety of applicable questions correctly and to devise and present legal arguments for their clients effectively.

Businessmen should find a way to determine that their lawyers can integrate facts regarding computer uses and transactions with existing legal rules by generalizing to find the real, broadened scopes of those rules within acceptable public policy.

Such a lawyer must be able to cut through the technical complexities that computer specialists present in order to find the real subject matter for legal purposes. Also, lawyers should not insist that the rules of law are out of date for today's technology. They should know how to apply those rules to that technology wisely.

In order to judge the skills of their potential lawyers, businessmen themselves must have some sense of the nature of the factual aspects of computer technology for legal purposes. Articles and books are available to help them get that sense, but they must be able to weed out the few good resources from the many poor ones.

Businessmen should conduct investigations of their potential legal talent not only by patient, searching oral inquiry but also by reviewing the candidate's legal articles and even actual agreements and other pertinent materials prepared for other clients.

In the investigation, the material should be examined for its literary quality. Agreements should be grammatical and understandable. Merely writing articles is not evidence of real understanding. Much legal literature on computer law is seriously deficient. Articles should be professional and accurate both factually and legally.

Candidates also should be asked about their participation in professional associations and educational activities that involve computer law, such as the Computer Law Association or the Computer Law Division of the American Bar Association's Section of Science and Technology.

Those organizations and many others conduct continuing professional education programs on the subject. It is appropriate to attend a lecture given by the potential lawyer. It is not unreasonable to subject candidates to a searching review along these lines.

Because computer acquisition and use involve legal questions in practically all fields of law, a good computer lawyer must be a versatile general corporate lawyer. Rarely can individual legal questions involving that technology be handled in isolation.

More often, a number of related questions in various fields arise simultaneously, such as intellectual property, taxes and liability for potential harm, and their answers must be integrated. Hence, such a lawyer must have a working knowledge of apparently diverse legal fields in order to at least identify pertinent questions if not to answer them as well. It turns out that a good computer lawyer must be a superb generalist.

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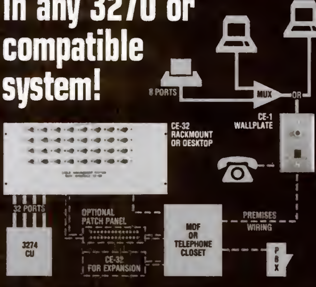

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MANAGEMENT

# Putting users to work (for you)

From page 105

fourths of the demand due to a perception of unsatisfactory performance by the central information services organization. The dissatisfaction stemmed from a desire for faster delivery, tailored quality rather than uniform standards and access and control of the system, the research found.

Looking to the future, half the departmental users indicated they would set up their own information services units, and more than one-third said they would take some steps in that direction. "It's getting to be a pretty common thing, kind of a creeping sort of thing," Davenport noted. Spokesmen for slightly more than half the central information services organizations said they expect their organizations to shrink.

"The growth of dispersed systems evoked emotionalism on both sides," said Cyrus F. Gibson, vice-president of Index Systems, Inc. Information services managers were concerned with their ability to carry out management mandates to control systems, he said.

The partnership's recommendations include steps to attune information systems strategy and guidelines to overall corporate goals and the needs of departmental users. Among the steps suggested are the following:

- Formation of a business systems support unit incorporating aims of both the information services organization and departmental users.
- Establishment of policies and procedures that allow users a choice of systems.
- Upgrading skills of information services personnel to improve communication with users. "Most information systems organizations are only dimly aware of the need to develop skills to relate to end users," Gibson noted.

The partnership also reported on a study of expert systems, which found 42% of the sponsors have a serious interest in the systems or have done research on them. However, few of the companies have a concrete strategy for the technology, Davenport said.

> *'Most information systems organizations are only dimly aware of the need to develop skills to relate to end users.'*
>
> — Cyrus F. Gibson
> Index Systems, Inc.

Furthermore, many of the efforts to exploit expert systems are being pursued outside central information services organizations, generally because would-be users do not want to wait for the information services unit to evaluate the projects, Davenport claimed.

The development efforts typically involve experts from outside the corporation and are characterized by "throwing big bucks at them and saying, 'come back with an application,' " he said.

A great majority of the systems are not tied to independent data bases although users say they plan to integrate the systems with data bases in the future, Davenport said. Some outside consultants developing systems "couldn't care less" about such integration, he added.

Davenport outlined a strategy for developing expert systems, calling for definition of applications to be developed, taking into account their potential value to the business and the company's level of financial commitment.

The development might be pursued through an application pull process, stemming from identified needs, or a technology pull effort, based on

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## MacKinney IBM-based utilities out

MacKinney Systems of Springfield, Mo., has announced software utilities for IBM mainframes.

CICS/FRS is a forward recovery system for CICS. The software is said to update backup files using CICS journals to recover any file data lost or corrupted due to program error, hardware problems, operator error or power loss.

Users control what updates should be applied to the file based on criteria such as date, time, transaction identification and terminal identification. According to the vendor, multiple files can be recovered in a single run. CICS/FRS works with all releases of CICS under DOS/VSE, VSE/SP, OS/VS1 and MVS. It costs $1,295.

Jcopy is a file utility for DOS/VSE or VSE/SP environments. It allows users to write simple programs with as few as five statements. Subroutines to access ICCF libraries, source statement libraries, Panvaler, Librarian and Power queues are included.

Jcopy processes sequential, ISAM, VSAM and DL/1 files, the vendor said. It has built-in functions for table handling, translating EBCDIC to ASCII, scanning for character strings and bit manipulation. It costs $1,995.

Also announced by MacKinney Systems was Release 6.0 of its Listcat Plus program, designed as a replacement for IBM's IDCAMS Listcat. Release 6.0 prints a condensed list of non-VSAM entries on OS or ICF catalogs in addition to the VSAM data set report and volume summary produced by previous releases.

Listcat Plus is priced at $695 for OS and MVS environments and $495 for DOS/VSE and VSE/SP users.

Another utility upgrade recently introduced is Release 3.0 of Power Commander-CICS. The product allows users to enter Power commands from a CICS terminal as if it were an operator console. The response from Power is displayed on the user's screen. Power Commander-CICS costs $495 or $195 per year.

## Wang mid-range mini bows

### Developed for secure information processing

Wang Laboratories, Inc. of Lowell, Mass., has announced a 32-bit minicomputer designed to meet Nacsim 5100A requirements.

The mid-range system, called the VS65T, is said to support up to 40 workstations. According to the vendor, it was developed for the secure information processing requirements of both government and commercial organizations.

The basic VS65T central processor with 1M byte of main memory, cache memory, a 360K-byte diskette drive, 16 ports, the operating system and assembler is priced at $25,000. It is fully compatible with the larger Wang 7585VST minicomputer at both the operating system and the application software levels, the vendor said.

Features of the VS65T include a single-board central processor with a 200-nsec instruction time that supports the full VS 32-bit instruction set, up to 4M bytes of main memory with 16K bytes of high-speed cache memory, the ability to support up to eight communications lines and six intelligent I/O processors, data processing system software that includes nonprocedural fourth-generation programming tools and office automation functions including Wang Office applications.

Peripherals available for use with the VS65T include the Wang Professional and Advanced Professional Computers, the 76M-byte and 288M-byte removable disk drives and the 75LIS-12VT laser printer. The VS65T also supports Wang fiber-optic connection options including the Fiber Optic Converter and the Fiberway Remote Cluster Switch.

In a related announcement, Wang introduced the 4230-OA/VS-T workstation for combined data and word processing. The 64K-byte modular workstation also meets Nacsim 5100A requirements.

The 4230-OA/VS-T consists of a medium-resolution monochrome monitor with a 12-in. screen, a detachable keyboard and a separate base and electronics unit. The keyboard has 101 keys, including 16 programmable function keys.

Features of the workstation include a keylock for security, a monitor arm, a communications board for workstation use with a Wang Office Information System-based system and an upgrade to a Tempest Wang 75 PC series Professional Computer or 74 XAPC series Advanced Professional Computer.

The 4230-OA/VS-T workstation is priced at $3,900. According to a company spokesman, it will be available in August. The VS65T minicomputer will be available in September.

## Mitrol offers External Interface

Mitrol, Inc. of Woburn, Mass., has introduced its External Interface, a software package that allows users of Mitrol's IBM mainframe-based fourth-generation language, Mitrol, to communicate with other IBM-based applications.

According to a company spokesman, External Interface was specifically designed to provide enhanced user accessibility to IBM's DB2 data base applications.

The External Interface is also said to allow users to communicate with other hardware environments. It makes use of the Systems Network Architecture (SNA) LU6.2 standard for advanced program-to-program communication. Use of SNA LU6.2 enables communications with systems from vendors such as Digital Equipment Corp., Tandem Computer, Inc. and Prime Computer, Inc. along with IBM Personal Computers and IBM Mitrol systems, the spoksman claimed.

In addition, the External Interface provides a set of facilities that allows users of other IBM-based applications, such as IMS and DB2, to call Mitrol products as well as to use Mitrol products to call up the other applications.

The initial license fee for External Interface is $25,000, the vendor said.

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## NEW PRODUCTS/SOFTWARE & SERVICES

### SOFTWARE & SERVICES

#### Systems software

**Gejac, Inc.** has announced **Bossman**, a security and control software system for Digital Equipment Corp. VAX/VMS environments.

Bossman is said to tighten operational control of computer users. It associates security control with functions, not users, allowing files access to users instead of users access to files.

The system manager can grant and withhold read, write, execute and delete privileges; allocate and limit function availability; and create and change priorities for different tasks for users.

Bossman is priced from $2,800 to $11,000 per CPU.

Gejac, P.O. Box 188, Riverdale, Md. 20737.

■

**CS Laboratories, Inc.** has announced **C/Script 36**, a Cobol application development system designed for the IBM System/36.

C/Script 36 is said to generate complete operator control language procedures, display formats and Cobol source and object members for SRT or MRT programs. It also generates programs for file maintenance, inquiry, data entry and reports and allows users to enter custom code at any point during or after generation. It interfaces to any System/36 editor for user-code entry and Help screen definition.

C/Script 36 is priced at $16,000.

CS Laboratories, 459 N. Dean Road, Auburn, Ala. 36830.

■

**Logic International, Inc.** has announced **DES/36** a data entry system designed for the IBM System/36.

DES/36 is said to be able to replace IBM 129 and 3741 key punch stations. It allows users to format input and includes the ability to separately define field and screen positions. Fields can be edited on-line, and up to 18 fields per record can be defined. Five field types are available, and up to five accumulators may be used.

Features such as autoskip, autodupe, protected fields, justification, auto record advance, constants, range checking and verification are available.

DES/36 costs $5,000.

Logic International, Suite 165, 5775-A Glenridge Drive, Atlanta, Ga. 30328.

#### Applications packages

**National FSI, Inc.** has announced the availability of its **Participant Accounting System** (PAS) software package on IBM 3000 and 4300 series mainframe computers.

According to the vendor, key PAS features include daily valuation or fixed cycle processing, full regulatory compliance and up to 30 investment vehicles per plan.

Pricing for PAS starts at $100 and varies with the size of the installation and the type of service.

National FSI, 4501 W. Mockingbird, Dallas, Texas 75209.

■

**Data Automation** has enhanced its **computer-aided design/computer-aided manufacturing** (CAD/CAM) software package available for Hewlett-Packard Co. Series 200, 300 and 500 computer systems.

New features include a command file capability that allows for interfacing with existing computer-aided engineering graphics software and integrated Data Com capability to transfer data to and from a mainframe computer.

According to the vendor, some functions of the CAD/CAM package include high-speed pan, snap grid and polar coordinates capability.

The package costs $2,495.

Data Automation, Suite 202, 125 W. Mission Ave., Escondido, Calif. 92025.

#### Utilities

**Softouch Systems, Inc.** has announced **CICS-FCTD**, an on-line utility for CICS.

CICS-FCTD is said to provide the creation and maintenance of definitions required for the CICS File Control Table. It automatically produces file labels and disk assignments for VSAM, ISAM and BDAM files.

The program also provides automatic deferred open functions. Files can be assigned a particular operational status.

CICS-FCTD is priced at $4,000 for a DOS license and $5,500 for an MVS license.

Softouch Systems, 8217 S. Walker, Oklahoma City, Okla. 73139.

■

**Boston Systems Office, Inc.** has introduced a relocatable assembler for the Hitachi Ltd. 64180 called the **64180 BSO/Assembler**.

The assembler was designed to operate on Digital Equipment Corp.'s VAX and Microvax. It suports the Hitachi extended I/O arithmetic instruction sets and provides relocation facilities, conditional code and macro capabilities as well as an array of advanced assembly features.

The 64180 BSO/Assembler is written in VAX native code and priced from $3,900.

Boston Systems Office, 128 Technology Center, Waltham, Mass. 02254.

■

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## NEW PRODUCTS/SOFTWARE & SERVICES

Continued from page 120

**Software Technologies & Research.**

VSUM is said to allow accurate VSAM data set design, analysis, monitoring and tuning in the MVS environment. Version 3.0 features a TSO/ISPF interface that will allow users to design VSAM key-sequenced, AIX and relative record data sets from TSO/ISPF screens.

Users may selectively list VSAM catalog entries based on user-specified selection criteria; request tuning and design recommendations for selected data sets; analyze and back up keyed VSAM data sets and display statistical reports on a terminal; and provide on-line tutorial for all VSUM ISPF functions.

VSUM costs $4,200.

Software Technologies & Research, 160 West St., Cromwell, Conn. 06416.

### Data base management systems

**Litton Industrial Automation Systems** has introduced **Sigen**, a data base management system designed for 16-bit and 32-bit computers such as Digital Equipment Corp. PDP/11 and VAX as well as IBM Series 1 systems.

Sigen is said to offer data integrity and data recovery capabilities. It features special-purpose data base calls, user-modifiable priorities and configurable cache memory.

Prices start at $12,500.

Litton Industrial Automation Systems, 5825 Oberlin Drive, San Diego, Calif. 92121.

■

**Enmasse Computer Corp.** has announced **Revision 1.3** of the **Enmasse Data Base Management System (E/DBMS).**

Revision 1.3 is said to offer faster inquiry and report writing facilities that can execute programs without affecting the performance of programs running on other parts of the Enmasse system.

E/DBMS provides integration with the ANSI 74 Cobol compiler. It runs on the Enmasse/Computer System (E/CS), a multiprocessor system for transaction-oriented applications.

Revision 1.3 of E/DBMS costs $4,500. The runtime version costs $2,500. Entry-level E/CS systems start at $60,000.

Enmasse Computer, 125 Nagog Park, Acton, Mass. 01720.

### Training software

**Software AG of North America, Inc.** has anounced **Natural/Elite**, a computer-aided instruction learning system for software training programs.

Natural/Elite is a mainframe-based system that allows students access to self-paced instruction from any authorized terminal or personal computer. It features four components: authoring, presentation, courseware and administration.

Natural/Elite is written in Natural, Software AG's fourth-generation language. The one-time cost of the system is $20,000. Ready-written courses range from $2,000 to $5,000.

Software AG of North America, 11800 Sunrise Valley Drive, Reston, Va. 22091.

## MICROCOMPUTERS

### Software utilities

**Keyword Office Technologies Ltd.** has introduced **Commander**, a multiuser window interface said to allow IBM Personal Computer users to gain access to applications and functions with a single keystroke.

Commander software is also said to enable system integrators to configure a user interface that fits a range of customized business requirements.

Commander provides access to up to 253 applications through user-defined keys. Within on-screen windows, users can create menus, submenus and Help files.

Commander is priced at $49.95.

Keyword Office Technologies, 2816 11 St. N.E., Calgary, Alta., Canada T2E 7S7.

■

The **Autocad Drafting Interface** program has been introduced by **Cadtrak Corp.**

The software interfaces the drafting capabilities of Autodesk, Inc.'s Autocad package with the three-dimensional plant design views of Cadtrak's Plant Trak package. It is said to translate an orthogonal or pictoral view from a 3-D Plant Trak model to Autocad for two-dimensional drafting work.

The Autocad interface is compatible with T&W Systems, Inc.'s Versacad and drafting systems and runs on the IBM Personal Computer, Personal Computer XT and AT.

The interface costs $1000.

Cadtrak, 823 Kifer Road, Sunnyvale, Calif. 94086.

■

**I. P. Sharp Associates Ltd.** has announced **Pricelink**, a software product that allows users to collect on-line pricing data from financial

Continued on page 124

Announcing
Computerworld's
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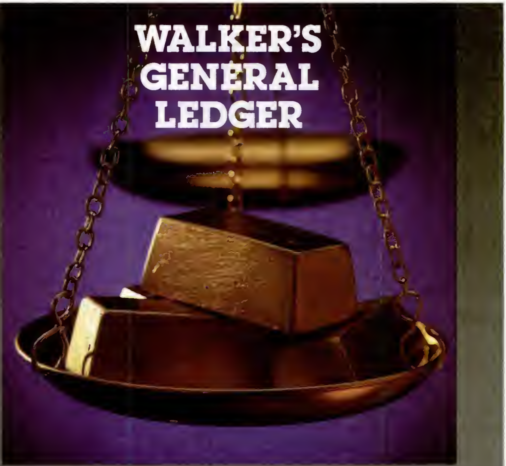

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## NEW PRODUCTS/MICROCOMPUTERS

**Continued from page 123**
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I.P. Sharp, Suite 1900, Two First Canadian Place, Toronto, Ont., Canada M5X 1E3.

### Software enhancements

**Mega Cadd, Inc.** has announced a new version of its **Design Board Professional** software for use in three-dimensional, computer-aided design applications.

The new version offers the ability to create computer models 150% larger than the size possible with the previous version. It requires 640K bytes of memory on an IBM-compatible personal computer. It can share data bases with two-dimensional drafting software packages such as Autodesk, Inc.'s Autocad.

The new Design Board Professional is priced at $2,150. Registered users of previous versions can upgrade for $400.

Mega Cadd, 401 Second Ave. S., Seattle, Wash. 98104.

■

**QNE International** has announced **Version 4.0** of **Q-Pro 4**, its fourth-generation microcomputer language and data base manager.

Version 4.0 utilizes Ashton-Tate's Dbase III data bases as well as its own data base files. Q-Pro 4 programs using the local-area network runtime provide multiuser facilities with true files and record lock to Dbase III data bases. The Q-Pro 4 local-area network runtime supports both IBM Personal Computer Network and Novell, Inc. Netware.

Q-Pro 4 costs $795 for the local-area network version and $595 for the single-user version. Q-Query, an optional post relational query language, costs $150.

QNE International, 136 Granite Hill Court, Langhorne, Pa. 19047.

■

**Opt-Tech Data Processing** has released **Version 3.0** of its **Opt-Tech Sort** utility for Microsoft Corp. MS-DOS computers.

Opt-Tech Sort is an Assembler Language sort/merge/select utility used in compilers, data base management system packages and application packages.

Features of Version 3.0 include record selection, record reformatting, comma-delimited files, Ashton-Tate's Dbase III support and dynamic memory allocation.

Opt-Tech Sort costs $149.

Opt-Tech Data Processing, P.O. Box 678, Zephyr Cove, Nev. 89448.

### Board-level devices

**Definicom Systems, Inc.** has announced the **DSI-32** family of 32-bit coprocessor boards for IBM-compatible personal computers.

The DSI-32 boards use very large-scale integration circuits providing a speed of 10 MHz, 64-bit number crunching capabilities and a memory management unit for Microsoft Corp. MS-DOS virtual memory functions.

The basic board features up to 2M bytes of expandable dual-port random-access memory.

Prices for the basic DSI-32 boards start at $1,495. Higher end expandable boards are priced from $2,295.

Definicom Systems, Suite 108, 31324 Via Colinas, Westlake Village, Calif. 91362.

■

**Cardco, Inc.** has announced **Amega**, a 1M-byte memory expansion board for the Commodore Business Machines, Inc. Amiga computer.

According to the vendor, the Amega board is a full-function add-on. It features pass-through design, full automatic configuration, multitasking random-access memory, no external power requirements and portability.

The Amega board costs $549.95.

Cardco, 300 S. Topeka, Wichita, Kan. 67202.

■

**American Computer & Peripheral, Inc.** has introduced the **American Turbo** adapter board and the **American Abovefunction Card**, a multifunction memory board, for the American XT, IBM Personal Computer, IBM Personal Computer XT and compatibles.

American Turbo allows users to toggle from 4.77 MHz to 7.37 MHz using a synchronized select switch.

The Abovefunction Card supports up to 2M bytes of expanded memory and provides serial, parallel and game ports.

American Turbo costs $150, and American Abovefunction starts at $380 without random-access memory installed.

American Computer & Peripheral, 2720 Croddy Way, Santa Ana, Calif. 92704.

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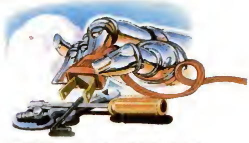

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## NEW PRODUCTS/MICROCOMPUTERS

### Auxiliary equipment

**The Maxi-Switch Co.** has announced its **Memory Pro** keyboard for IBM Personal Computers, Personal Computer XTs, ATs and compatibles.

Memory Pro is said to feature an AT-type keyboard with separate cursor and numeric pads, a Maxi-Mouse providing diagonal cursor movements, fast repeat key to double the autorepeat rate and 10 additional soft user-definable function keys.

Memory Pro costs $195.

Maxi-Switch, 9697 E. River Road, Minneapolis, Minn. 55433.

## COMMUNICATIONS

### Software

**Network Innovations Corp.** has ported its **Multiplex** communications software package to the Hewlett-Packard Co. HP 9000 Series 800 Model 840 computer systems.

Multiplex connects applications such as Lotus Development Corp.'s 1-2-3 to data from HP's HPSQL data base. Users of the HP Vectra personal computer, IBM Personal Computer and compatibles can select data from the data base and extract it across a network into an automatically formatted personal computer file.

Multiplex also features file transfer, network file management and terminal emulation capabilities.

Prices start at $695 for single copies on IBM Personal Computer AT host systems.

Network Innovations, 20863 Stevens Creek Blvd., Cupertino, Calif. 95014.

■

**Cincom Systems, Inc.** has ported **Net/Master**, its network management system, to IBM's DOS/VSE operating system environment.

Net/Master is said to provide multiple session support, network security and network and subsystem access; automate network operations; and provide file transfer between distributed sites. Users can access multiple applications concurrently and, according to the vendor, can be insulated from VTAM and CICS.

Net/Master is priced from $15,000.

Cincom Systems, 2300 Montana Ave., Cincinnati, Ohio 45211.

### Multiplexers/Modems

**Data Comm for Business** has announced its **SPL2 statistical multiplexer**.

The SPL2 is said to transfer asynchronous terminal data transparently over a synchronous or asynchronous composite channel at up to 19.2K bit/sec. Each of the two terminal ports can be set for up to 9.6K bit/sec.

The SPL2 operates with leased-line and dial-up modems. Its statistics port displays set-up parameters and activity statistics for the composite channel and the terminal ports. XON/XOFF, CTS busy high or low and Hewlett-Packard Co. ENQ/ACK flow controls are all switch-selectable.

The SPL2 costs $795.

Data Comm for Business, 807 Pioneer, Champaign, Ill. 61820.

**Concord Data Systems, Inc.** has announced the **CDS 224 X.PC** and the **CDS 224 X.PC Mux**, modems said to support McDonnell Douglas Network Systems Co.'s Tymnet X.PC error-correcting protocol.

The full-duplex, dial-line modems reportedly operate at either 1,200 or 2.4K bit/sec.

According to the vendor, both modems have a two-wire dial interface for connecting to the public-switched telephone network.

The CDS 224 X.PC and the CDS 224 X.PC Mux support CCITT V.22 and feature auto-dial and autoanswer.

The CDS 224 X.PC Mux is said to permit multiple simultaneous transmissions over the same phone line.

The CDS 224 X.PC is priced at $795.

The CDS X.PC Mux costs $1,295.

Concord Data Systems, 297 Williams St., Marlboro, Mass. 01752.

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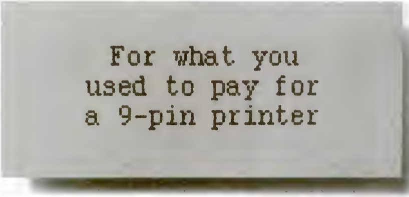
SEE PAGE 46

PRINTERS'



When you see our new Pinwriter™ P6, P7 series dot matrix printers, you'll think you're in a time warp.

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## NEW PRODUCTS/COMMUNICATIONS

### Test equipment

**Fox Research, Inc.** has released **10-Test**, a diagnostic tool for use with the company's 10-Net local- area networking system for IBM Personal Computers and compatibles.

10-Test was designed to pinpoint board, tap-box and wiring problems on the local-area network. It consists of a diagnostic module, a transformer, a diskette with the diagnostic software and an operations manual.

10-Test is priced at $695.

Fox Research, 7016 Corporate Way, Dayton, Ohio 45459.

■

**Telenex Corp.** has announced the **Autonex MSS-256 Matrix Switch**, part of a matrix switching system for data network test access and system reconfiguration.

The Autonex Matrix Switch is said to offer unlimited bandwidth or line handling capability. It is a true circuit switch with each data channel following a separate physical circuit path. It introduces no speed restrictions, and data rates above 10M bit/sec. can be accommodated.

The system allows user cable distances of up to 1,000 ft end to end.

The Autonex MSS-256 Matrix Switch, which is said to provide a 128-line by 128-line matrix, is priced at about $290 per port.

Telenex, 502 Pleasant Valley Ave., Moorestown, N.J. 08057.

## SYSTEMS & PERIPHERALS

### Graphics systems

**Imaging Technology, Inc.** has enhanced its **Series 100** real-time, single-board image processors.

The enhanced version features an expanded frame memory to provide storage of multiple images, an optional resolution of 640 by 512 pixels for acquiring, processing and displaying square pixels, the ability to simultaneously scan different sections of frame memory and pseudo-color output, according to the vendor.

The standard version costs $3,995. Expanded Frame Memory versions cost $4,295 or $4,495.

Imaging Technology, 600 W. Cummings Park, Woburn, Mass. 01801.

### Data storage

**MDB Systems, Inc.** has announced the **MLSI-ESDI-RM** and **MV-ESDI-RM** enhanced small device interface disk controllers for Digital Equipment Corp. Q-bus and Microvax computers, respectively.

The quad-size disk controller has a maximum data transfer rate of 2.45M bit/sec. According to the vendor, it has been certified to operate hard-sectored drives. It features RM03 and RM05 emulation.

The controller supports two physical drives ranging in size from 67M bytes to more than 4G bytes. According to the vendor, other features include direct memory access autothrottle, multilevel interrupts and self-test at power on.

The MLSI-ESDI-RM controller costs $1,671, and the MV-ESDI-RM controller is priced at $1,707.

MDB Systems, 1995 N. Batvia St., Orange, Calif. 92665.

■

**Alpha Data, Inc.** has released the **Atlas 520**, a 520M-byte Winchester-type disk drive.

The Atlas 520 disk drive houses 76 moving heads and is said to be able to access 2.5M bytes instantly.

The Atlas has a head lifter system that ensures there is no head-to-disk start/stop contact. Also, according to the vendor, Atlas 520 is interface and format compatible with ANSI/ESMD specifications and hardware and software configurations.

The Atlas 520 costs $10,850.

Alpha Data, 20750 Marilla St., Chatsworth, Calif. 91311.

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## Printers/Plotters

**Genicom Corp.** has unveiled the **3410 Quiet** wide-carriage dot matrix printer.

The 3410 Quiet is said to feature multiple-mode printing, high-duty cycle and a noise level of fewer than 55db. It has an 18-wire printhead and offers speeds ranging from 400 char./sec. in draft mode to 120 char./sec. in letter-quality mode.

It offers 18- and 10-pitch printing for 244 and 136 columns, respectively.

Centronics Data Computer Corp. parallel and RS-232C serial ports are standard, as are four character styles. The printer accommodates up to six-part paper via either rear or bottom feeding.

The 3410 Quiet is priced at $2,645.

Genicom, Waynesboro, Va. 22980.

**Versatec, Inc.** has announced the **CE 3400 series** of electrostatic color plotters.

The plotters are said to offer 400 point/in. resolution. The CE 3424 accommodates 24-in. media widths and the CE 3436 accommodates 36-in. media widths. They are said to produce output on opaque paper or polyester film.

Available in July, the 3424 costs $53,500, and the 3436 costs $69,500.

Versatec, 2710 Walsh Ave., Santa, Clara, Calif. 95051.

■

**Versatec, Inc.** has announced **Model C2558** of its **Spectrum** electrostatic color plotter series.

Model C2558 is said to provide 400 point/in. resolution.

According to the vendor, an A-size full-color plot with 400 point/in. resolution is produced in 75 seconds and a B-size plot in 90 seconds.

When acting as a page printer, it prints 1,100 line/min.

Spectrum is an 11-in. format electrostatic color plotter.

It reportedly offers 256 predefined colors and an additional 256 user-defined colors from a palette of over 1,000 colors.

The Model C2558 is priced at $14,950.

Versatec, 2710 Walsh Ave., Santa Clara, Calif. 95051.

## Power supplies

**Kalglo Electronics Co.** has added the **Model LS500** to its Aegis line of power conditioning equipment.

The standby uninterruptible power system is said to provide backup power in 120 or 240V, 60 or 50Hz with 500W-VA capacity.

It utilizes pulse-width modulation technology and is furnished with an internal 24-volt sealed rechargeable battery, two voltage-surge-protected AC outlets, audible and visual power failure warning system, test mode indicator and switch and replaceable external fuses.

The Model LS500 is priced at $795.

Kalglo Electronics, Dept. CP, 6584 Ruch Road., E. Allen Tnpk., Bethlehem, Pa. 18017.

## Components

**Texas Instruments, Inc.** has announced its fully qualified 10-MHz **TI32000** 32-bit microprocessor chip set.

The TI32000 chip set consists of the TI32016, a 48-pin central processing unit; the TI32201, a 24-pin timing control unit; the TI32081, a 24-pin floating-point unit; the TI32082, a 48-pin memory management unit; and the TI32202, a 40-pin interrupt control unit.

The five-device chip set is priced at $289 in 100-unit quantities.

Texas Instruments, P.O. Box 809066, Dallas, Texas 75380.

## Auxiliary equipment

**Buddy Products** has introduced the **Number 925** printer stand for its Saver Series product line.

The stand features heavy-gauge tubular steel panel legs with textured steel panels and double-sided plastic laminated tops with an oak or walnut wood-grain finish. It has a shelf below the surface for storing printout paper.

The table measures 30 by 30 by 16½ in. It is priced at $131.55.

Buddy Products, 1350 S. Leavitt St., Chicago, Ill. 60608.

## PRICE REDUCTIONS

**PC Source** has cut the price of its **Standard-286** IBM Personal Computer AT-compatible system.

The machine features an Intel Corp. 80286 processor, optional 80287 coprocessor socket, 8-MHz option, 240K bytes of random-access memory, 1.2M-byte diskette drive, dual diskette, fixed disk drive controller board, 200W power supply and eight expansion slots. It comes with Microsoft Corp. MS-DOS 3.1.

The Standard-286 costs $1,395.

PC Source, 12303-G Technology Blvd., Austin, Texas 78727.

■

**Mosaic Software, Inc.** has announced a price reduction on its **Twin spreadsheet software** program for IBM Personal Computers and compatibles.

The Twin is said to work like Lotus Development Corp.'s 1-2-3 software. It features presentation graphics and file manager capabilities as well as user-specifiable colors, shadings, fonts, titles, footnotes and labels.

Twin supports hard disk systems, graphics plotters, printers and a math coprocessor. Minimum system requirements are two disk drives and 260K bytes of random-access memory.

The reduced price for Twin is $99

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"*We had four specific positions for MIS/DP consultants that we needed to fill in northern New England. We used the local newspaper on a weekly basis, but people who are willing to move usually aren't reading the local Sunday paper. So, I felt this was a perfect opportunity to try Computerworld,*" says Bjorn.

According to Bjorn, he's quite satisfied with the results. "*From Computerworld, we filled 75% (3 out of 4) of the positions with the responses from the first week, and the remaining position with the response from the following week. These results alone made my ads in Computerworld worthwhile.*"

And Bjorn also recognizes a second benefit to advertising in Computerworld. "*The beauty of using Computerworld is that it's read by people in the computer industry who have a need for consultants, as well as being read by consultants who need to keep up to date on the marketplace,*" says Bjorn. "*So we not only reach qualified candidates to fill our current openings, but we are creating awareness of the services that DASI has to offer,*" says Bjorn.

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# COMPUTER INDUSTRY

*Section begins on page 174*

# Building success on foundations of controlled innovation

## Directed research key in promoting advances

**By Glenn Rifkin**

The key to success in today's technology-oriented world of business is to use innovation as the foundation for the attack. So says Richard Foster, director of McKinsey & Co., a leading management consulting firm, in his new book *Innovation: The Attacker's Advantage* (Summit Books, 1986).

According to Foster, innovation can and must be controlled. In too many companies today, top management doesn't believe research can be managed. They think innovation and scientific advance are matters of luck and individual initiative and that developments cannot be anticipated.

Foster recently spoke about how his theories might apply to the traditional mainframe vendors that compete with IBM.

**CW:** Was it the lack of innovation that created the stagnation in most of the BUNCH companies, or was it simply that IBM was too strong overall?

**FOSTER:** IBM has a very dynamic sense of their strategy. Every move they take, they take with an eye toward what the move after that will be. They are truly playing a chess game, it seems to me.

What has happened to the BUNCH is that they have come out with innovations with the implicit assumption that it's the 'big bang' innovation that's going to take them forward and going to allow them to beat IBM. But the next thing they know, IBM is counterpunching on that innovation, dropping the price and introducing a new product that has a whole new level of cost/performance.

Richard Foster

By that time, the guys in the BUNCH are out of resources. The BUNCH firms haven't been quite as circumspect as they ought to be about the competitive realities and what they're going to have to do, not only to compete once, but to compete continuously over time.

If they were, they might well decide to skip a generation here and there and put their resources into something that's really going to make a difference — or to at least be on tracks that are going to allow them to compete in individual niches.

IBM is a terrific marketing company. I do not buy the description that they aren't the best technology company in the world because, to me, the best technology is the one that meets the largest group of consumers' needs. That isn't necessarily the most advanced performance at all, but a product which has very high price/performance ratios. IBM is just damn good at that, and they're good at innovation.

**CW:** What does this mean for IBM's rivals, then? Is it totally hopeless?

**FOSTER:** I doubt that it's totally hopeless, but it certainly implies that they have to focus, that they have to have a very clear notion of how they're going to fit in and sustain a counter attack from IBM. It means that they have to be very focused on particular technologies, which have more potential than the ones IBM is working on, and they have to be focused on individual market segments.

IBM's very size, which is certainly an asset in many ways, can be a negative because that very size certainly is unlikely to speed decision making and responsiveness, and so it represents a dynamic opportunity for the BUNCH.

**CW:** Do you think mergers or acquisitions such as Burroughs Corp. and Sperry Corp. can help, or is that sort of a Band-Aid?

**FOSTER:** If we don't think about mergers but maybe think about alliances, where one company doesn't have all the requisite skills to implement any of the competitive vision that they have, then it could be beneficial in that way. My guess is, from a point of view of consolidating capacity, mergers could be helpful. But unless some creative spark is put into that equation, then that won't be enough.

Only one out of 10 mergers is successful, and so, if you're going to be that one, you've got to have a pretty good idea. You've got to be pretty successful at implementation as well. It's a tough job.

**CW:** You mentioned in your book that companies need to become attackers rather than just defenders of their markets. It seems that the BUNCH companies along with IBM are older, conservative companies that are slow to move and take advantage of market opportunities. What can they do to address this problem?

**FOSTER:** Certainly, they have to have a sense of where the business is

See **BUILDING** page 137

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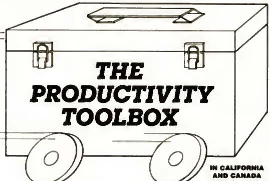

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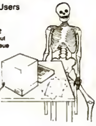

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# Japanese vendors urged to move production

## Overseas manufacturing may ease trade friction

By Takehisa Kondoh
Computerworld News Service

TOKYO — The new chairman of the Electronic Industries Association of Japan (EIAJ) has urged Japanese electronics vendors to move more of their manufacturing facilities overseas to help the nation ease trade friction with Japan's international partners.

Speaking in his inaugural address to the EIAJ, Shoichi Saba called on the Japanese electronics industry to be "more internationally minded." He said the EIAJ is ready to expand trade dialogue with U.S., European and other foreign electronics trade groups like the American Electronics Association (AEA).

Saba, 67, stepped down as president of Toshiba Corp. in April to succeed Sony Corp. Chairman Akio Morita as leader of the 611-member EIAJ.

Saba, however, said he was concerned whether Japanese electronics manufacturers that shift production outside the country will find suitable components available in their host nations.

"Unlike in the U.S. and Europe, where components for electronics assembly are normally produced by the assemblers themselves, Japanese assemblers need to rely on independent suppliers for the parts they need," he observed. Independent component makers are not easily found in the U.S. or Europe, he maintained.

Saba stressed that cooperation is needed to offset the Japanese industry's "disappointing and significant decline from the outstanding growth of the past." Japanese electronics revenue grew a scant 2% to $105.8 billion in 1985, while electronics products exports dropped 5% to $52.9 billion in 1985, he noted.

Japan's electronics investment abroad, particularly in the U.S., has increased in recent years. In 1983-'84, Japanese production in the U.S. reportedly multiplied 2.5 times.

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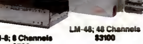

LM-8; 8 Channels $700

LM-48; 48 Channels $3100

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Computerworld June 16

# IBM christens $125 million research center

By Jeffry Beeler

SAN JOSE, Calif. — IBM recently christened a $125 million structure that will serve as the new home for one of the firm's three main research facilities.

Construction of the 485,000 sq-ft Almaden Research Center (ARC) "exemplifies IBM's continuing commitment to innovation," IBM Chairman, President and Chief Executive Officer John F. Akers told approximately 1,000 opening ceremony attendees in a brief prepared statement.

With its 107,000 square feet of lab space, the three-story building replaces IBM's former San Jose Research Laboratory, which for nearly 30 years had coexisted with the company's General Products Division, also based in San Jose.

Late last year, IBM began moving the occupants of its existing laboratory, which the firm had outgrown, to the new space roughly five miles away, according to ARC director Frank Mayadas. Today, with the relocation almost complete, the center houses some 800 scientists and engineers, who, for the first time since 1957, have a facility all their own.

ARC forms part of IBM's Research Division, which also embraces two other such facilities — the Thomas J. Watson Research Center in Yorktown Heights, N.Y., and its counterpart in Zurich.

### Scientific investigation

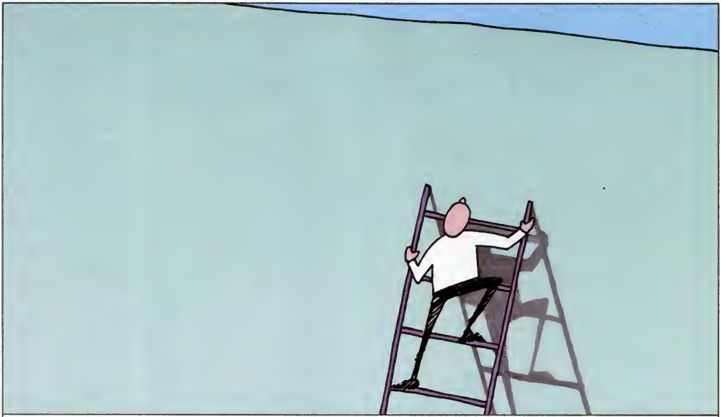
Despite its change of address, ARC will stick to the same avenues of scientific investigation as the laboratory at the recently vacated site. The center currently conducts basic research in six key technical specialties: physical science, polymers, data storage, I/O, manufacturing and computer science.

The West Coast laboratory is probably best known for its development of the relational model for data base management systems. Spearheaded in the late 1970s by E. F. Codd, the work subsequently led to the announcement of IBM's SQL/DS and DB2.

The lab's contributions to the advancement of magnetic disk storage technology are also well known. In the early 1950s, the facility designed and built the IBM 350 Random Access Method of Accounting and Control, reputed to be the world's first commercial disk file product.

Today, ARC's storage-related research continues as the center explores the potential of emerging recording technologies such as optical media and, at the same time, seeks to refine the capabilities of conventional magnetic disks. One of installation's goals, for example, is to maximize recording densities by reducing the flying height between read/write heads and thin-film surfaces.

ARC researchers are also experimenting with alternative manufacturing and product testing techniques that may someday enable the firm to expand its production volumes without forcing it to enlarge its



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Perhaps it's because Data Design is increasingly recognized as one of the finest applications software companies in the world. It's a realization that has come not just to our clients, but to our competitors as well. Mainframe financial software packages from Data Design are consistently rated the best in nationally-recognized independent software surveys—year after year.

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It could be the increasing realization among companies that vendor size and a familiar name do not guarantee happiness. Especially when software comes from "single source" or "all-things-to-all-people" vendors. They are unable to produce the type of superior product available from a firm that specializes in a specific application area. A firm like Data Design.

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# Building success on innovation

From page 132

going to go and how they can successfully compete over time in that business. That's first and foremost; a realistic notion of that.

Second, having viewed the castles in the sky, they're going to have to have a way of building them brick by brick, which means entry strategies which will of themselves be successful.

Given those two things, an expansible strategy very much like the Japanese have — where they may take longer for the first generation of the product to come out, but the second comes faster, the third comes even faster, the fourth comes even faster — a notion like that may be enough to help them.

They would have to go through some fairly major organizational changes, and they'll probably end up having groups that are separate from their own.

They may even go to a Corning-like structure, where Corning Glass

*Computer Industry section begins on page 174.*

Works took some of their best ideas, evaluated their strengths and weaknesses and went out and found partners that could meet their weaknesses.

They then set up entirely separate companies with separate boards of directors and were content to keep a minority equity position in the whole thing before they moved ahead.

Maybe radical notions like that are necessary. Minor incremental changes from where they are, given what's happening in hardware and software, is unlikely to get them anything more than what they've already received.

**CW:**The BUNCH faces the unenviable task of competing against one of the greatest marketing organizations in the history of business. How can they become attackers against such a formidable foe?

**FOSTER:**The thing about IBM is that it is probably the biggest attacker that we've ever known. To learn the skills of attacking, you have to learn to attack yourself first. IBM really understands that, so they are a very formidable force, there's no doubt about it.

On the other hand, defenses are possible and successful. IBM is a juggernaut but not a uniform juggernaut. I have clients that IBM services that are none too happy with the service that they're getting. There's got to be distribution of those things, there's got to be groups that are less happy than more happy, therefore there have to be niches of opportunity.

The challenge for the BUNCH is to go out and figure out what those are, recognizing that IBM is going to be responding, and get ready for that response. But those are all holding actions.

In the long run, they're probably going to have to do something that has the potential for changing the game, whether that be parallel pro-

# Sperry minis win $250 million Army contract

## Series 5000 Model 80 beats out Honeywell, IBM for six-year deal

MCLEAN, Va. — Sperry Corp. recently won a U.S. Army contract worth about $250 million for up to 1,800 of its Series 5000 Model 80 Unix minicomputers.

Despite the fact that four companies vied for the quarter-billion-dollar deal, Sperry, in a sense, had an edge on the competition.

One of the other finalists was System Development Corp., a subsidiary of Sperry's proposed merger partner, Burroughs Corp.

The order was won by Sperry's Federal Government Marketing Organization and is one of the largest government contracts ever for Unix-based computer systems, a Sperry spokesman said.

The other two contenders for the contract were Honeywell, Inc. and IBM.

### Contract includes software, support

The six-year contract was awarded by the U.S. Army Information Systems Selection and Acquisition Activity in Alexandria, Va., and includes software, technical support and maintenance.

Sperry will supply its Series 5000 Model 80, a 32-bit minicomputer, which runs Unix Release V.2 in a multiprocessor architecture.

The system is manufactured according to Sperry specifications by Arete Systems Corp. of San Jose, Calif.

### Requirements not yet defined

According to a government spokesman, no particular requirements for use of the system have been defined yet.

However, the minicomputers are administrative-type systems commonly used for office automation, supply ordering, finance, budget, funding and transaction processing.

— Eddy Goldberg

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# No-shows at NCC

From page 174

general-interest trade shows where their presence was de rigueur during the boom years.

But the NCC exhibitor list is only one benchmark on the state of a still-vibrant industry, and retrenchment has produced more creative approaches to the marketplace.

The most daring of all, Burroughs Corp.'s pending $4.44 billion takeover of Sperry Corp., is the most dramatic example of a major vendor choosing a growth path that would have been unthinkable in the days of batch processing and core memory.

Elsewhere in the BUNCH, NCR has repositioned its entire line and targeted the

> ***Major vendors have learned, reluctantly, how to survive (and in some cases thrive) in a slower, more cautious and more demanding MIS marketplace.***

transaction processing market. Honeywell, Inc. is investing new corporate energy and dollars in the recently languid office automation sector.

The more traditional strategy of going toe-to-toe with IBM at the high end is obviously a dubious prospect now, especially in the context of the overall slowing of mainframe sales that seems certain to continue.

In the past year, major vendors have learned, reluctantly, how to survive (and in some cases thrive) in a slower, more cautious and more demanding MIS marketplace. From the vantage point of an apparently lackluster NCC in the scorching Nevada desert, the overall growth prospects for the industry still look bleak.

But with the right mix of product niches, vertical markets, international markets, tight fiscal controls and strategic partnerships, large systems vendors can get healthy again. That right mix can be a very elusive goal, but the rewards for those that find it can still rival the profits of earlier, easier times.

■

IBM President, Chief Executive Officer and (as of June 1) Chairman John F. Akers will be honored at a Waldorf-Astoria black tie berger Award from Barnard College, the women's arm of Columbia University.

The award recognizes Akers' "personal and professional commitment to the advancement of women within the corporate community," but a closer look reveals that the choice of honoree is very close to home. New York City's Sulzberger family also publishes *The New York Times*, whose corporate board includes a director named John Akers.

# Prime nets supermini deal with U.S.

NATICK, Mass. — Prime Computer, Inc. recently announced its largest contract ever, an agreement valued at more than $64 million with the U.S. Department of the Interior for the sale of up to 447 superminicomputers.

Under the five-year contract, Prime will provide office-based and computer room systems spanning its product line. Prime will also furnish software, maintenance, training and other services.

The Prime systems will be used to simulate, map and analyze data gathered by satellites and other sources. Typical uses will include forecasting the environmental impact of factors such as acid rain, road construction and prolonged temperature conditions.

The systems will operate in approximately 220 Interior Department field offices in 21 states. They will be linked via an X.25 packet-switching network. The department currently operates 70 Prime computers in the U.S. Geological Survey's Water Resource and Geological divisions.

## IBM ASCII terminals:

# The case in black and white.

**Introducing a somewhat more colorful member of the family.**

Meet the IBM 3164 ASCII Color Display Station.

It gives you eight foreground and eight background colors. On a 14" screen.

And because of its 8 x 16 character matrix, the 3164 gives you clear, crisp characters in color.

But is color any reason to buy IBM's 3164? It is, according to studies that indicate the use of color increases productivity, decreases errors and promotes user satisfaction.

Color, of course, is far from the sole reason for choosing the 3164. To appreciate the others, you should get to know the rest of our ASCII family.

**Emulation. Another side of the family.**

Our ASCII terminals are designed to fit into existing systems. Even if the systems aren't ours.

| Emulation Capability | |
|---|---|
| 3161 | IBM 3101 Model 881<br>ADDS Viewpoint*<br>Hazeltine 1500*<br>Lear Siegler ADM-3A*<br>Lear Siegler ADM-5*<br>TeleVideo 910* |
| 3163 | IBM 3101 Model 881<br>DEC VT 52*<br>DEC VT 100*<br>TeleVideo 950* |
| 3164 | IBM 3101 Model 881 |

For example, our basic ASCII Display Station, the IBM 3161, emulates up to six terminals. And the advanced-function 3163 emulates a number of higher level ASCII data streams.

| Features | 3161 | 3163 | 3164 |
|---|---|---|---|
| Screen size | 12" | 12" | 14" |
| Lines x characters | 25x80 | 25x80 | 25x80 |
| Character matrix | 8x16 | 8x16 | 8x16 |
| Double-sized characters | No | Yes | Yes |
| Line drawing characters | 24 | 24 | 24 |
| Vertical scroll | Jump | Jump/ Smooth | Jump/ Smooth |
| Definable function keys | 24 | 24 | 24 |
| Windowing | No | Yes | Yes |
| Partitioning | Horiz. | Vert./ Horiz. | Vert./ Horiz. |
| Characters in buffer | 1920 | 7680 | 7680 |

What's more, every one of our ASCII terminals can operate in its own function-rich native mode.

**Our family is flexible.**

Our unique plug-in cartridges allow for considerable flexibility in your operation. For example, simply by switching cartridges you can shift a terminal from one data stream to another.

And, in many countries cartridges are also available that go beyond emulation to let you operate your ASCII terminals in several foreign languages. Appropriate foreign language keyboards are also offered.

**Enhanced ergonomics. Another family trait.**

All our ASCII terminal keyboards have 102 keys. But that's not all they have in common. Every keyboard also has a low profile, gentle contour and typewriter touch.

And our keyboards have programmable function and editing keys so they can be custom-tailored to fit your application needs. The 3163 and 3164 models also have redefinable and recappable keys.

Superior ergonomic design isn't confined to the keyboard, however. All three displays tilt and swivel for maximum user satisfaction. And, of course, by making the display easy to read, we made it easier on the eyes. In addition to the 8 x 16 character matrix, we gave it an advanced non-glare etched screen, cursors, and character and field attributes like blink, reverse video, underscoring and dual intensity.

**High standards. Competitive prices.**

Quantity discounts are offered, too. And financing is available through the IBM Credit Corporation. Best of all, each terminal comes with the quality, service and support you'd expect from IBM.

Contact your IBM marketing representative, or call 1 800 IBM-2468, Ext. KC/90, for the IBM Authorized Distributor nearest you. And we'll present more evidence in the case for IBM's ASCII terminals.

It may be all you need to color your view.

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## COMPUTER INDUSTRY

### EXECUTIVE CORNER

**Don Anselmo**, a former AT&T executive, has been named president and chief operating officer of Mitek Systems Corp. A 29-year veteran of AT&T, Anselmo most recently was director of computer-aided design and manufacturing at the firm.

■

**C. Richard Moore** has been appointed president, chief executive officer and director of Excelan, Inc. Moore, 51, was previously president and chief operating officer of Valid Logic Systems, Inc. of San Jose, Calif.

■

**Connie E. Austin** has been named president of Sellectek, Inc., the company that developed Infomaster, a computer-aided retailing system. Austin, 35, was promoted from Sellectek executive vice-president of marketing and sales.

■

**William J. Adams** has been named vice-president and general manager of Harris Corp.'s Digital Telephone Systems division. Adams succeeds **Donald Green**, who will serve as consultant to the company.

■

**Eugene W. Buckley** has been promoted to staff vice-president, financial administration, at Sperry Corp. Buckley, who also serves as assistant to Joseph J. Kroger, Sperry's president and chief operating officer, joined the company in 1951.

■

Three executives of Xerox Corp. have been elected corporate vice-presidents: **Addison B. Rand**, vice-president of Xerox's business systems group in Rochester, N.Y., and general manager of its national marketing distribution organization; **John C. Shoemaker**, vice-president of the systems group in El Segundo, Calif., in charge of group operations; and **William J. Spencer**, vice-president, corporate research, at company headquarters in Stanford, Conn.

■

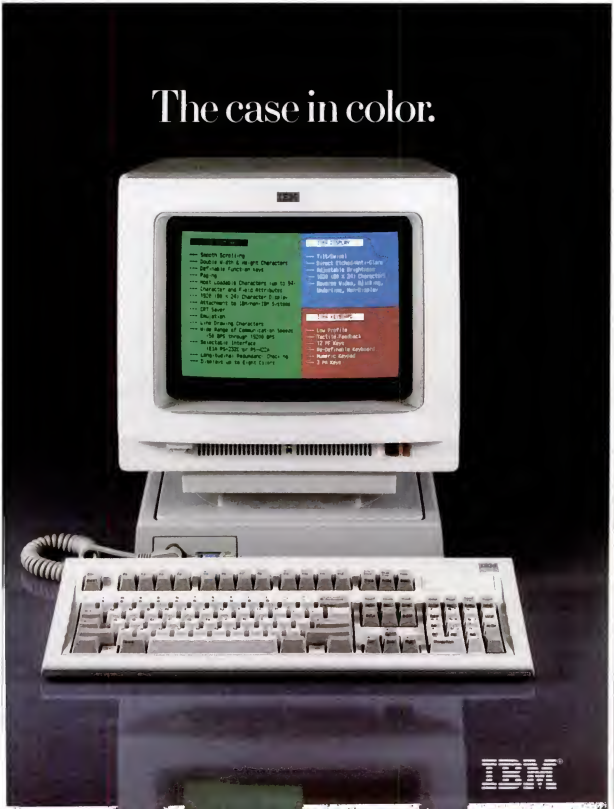
**David Caplan**, Tolerant Systems, Inc. president, has become the company's chief executive officer on a permanent, full-time basis. For the last 16 months, Caplan has served as a general partner of Adler and Co., the New York-based venture capital firm that is Tolerant's principal investor.

■

**Robert Bressler** has joined 3Com Corp. as vice-president and general manager of the Application Software Division. Prior to this appointment, he spent more than 13 years at Bolt, Beranek and Newman in Cambridge, Mass.

■

Delphi Systems, Inc. has announced several changes in senior management. **Walter F. Bauer** has been elected chairman of the board and chief executive officer. Bauer founded Informatics General Corp. in 1962. **S. George Nazarian** has resigned his positions as chairman and director to pursue other business interests. **Kenneth W. Bitticks** has resigned as president and chief executive officer but will continue to serve on the board of directors. **Richard R. Janssen**, chief operating officer, has been elected president.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**Voice Recognition: Less Talk and More Action**
*Wednesday, July 9, 3:00-4:30, Room D*
**Choosing a Local Area Network: A Multi-Faceted Decision**
*Wednesday, July 9, 1:00-4:30, Room E*
**Issues and Alternatives of Micro-to-Mainframe Connections**
*Thursday, July 10, 10:00-12:30, Room B*
**A Technical Presentation by IBM (see Wed. July 9, 1:30)**
*Thursday, July 10, 11:00-12:50, Room A*
**Portable Computers: Solutions Finally Finding Application**
*Thursday, July 10, 11:00-11:50, Room C*
**The Role of Management in Securing Computer Systems**
*Thursday, July 10, 11:00-12:50, Room D*
**Migration Patch and Time Bombs**
*Thursday, July 10, 11:00-12:50, Room E*
**The Write Stuff: A Word processing Panel Discussion**
*Thursday, July 10, 12:00-12:50, Room C*
**Customized Microcomputer-Based Information Systems**
*Thursday, July 10, 1:00-2:50, Room A*
**Information Management for Corporate Decision Makers**
*Thursday, July 10, 1:00-1:50, Room C*
**The System/36 and Networked PCs: A Hands-On Comparison**
*Thursday, July 10, 1:00-2:50, Room D*
**Electronic Printing: A Demystifying Look at The Options**
*Thursday, July 10, 1:00-1:50, Room E*
**Forces of Change in the Microcomputer Industry**
*Thursday, July 10, 1:30-3:30, Room B*
**A Technical Presentation by IBM (see Wed. July 9, 1:30)**
*Thursday, July 10, 2:00-2:50, Room C*
**Automation of the System Development Process on the PC**
*Thursday, July 10, 2:00-2:50, Room E*
**Software Buying Plans of Corporate PC Users**
*Thursday, July 10, 3:00-4:30, Room A*
**Multi-User Systems & LANs: How They Fit Into a Company's Plans**
*Thursday, July 10, 3:00-4:30, Room C*
**Micro-to-Mainframe Communications: The Industry Catches Up**
*Thursday, July 10, 3:00-4:30, Room D*
**On-Line Meetings: A Telecommunications Application With a Competitive Edge**
*Thursday, July 10, 3:00-4:30, Room E*
**Project Management Using Microcomputers**
*Friday, July 10, 10:30-12:30, Room B*
**A Technical Presentation by IBM (see Wed. July 9, 1:30)**
*Friday, July 11, 11:00-11:50, Room A*
**Graphics In Word Processing and Database Applications**
*Friday, July 11, 11:00-12:50, Room C*
**Presentation on the State of the Industry**
*Friday, July 11, 11:00-11:50, Room D*
**Corporate Training: An Integrated Approach**
*Friday, July 11, 11:00-11:50, Room E*
**Office Automation from the Bottom Up**
*Friday, July 11, 12:00-12:50, Room A*
**Computer Contracts—Upgrades, Support, and Service**
*Friday, July 11, 12:00-12:50, Room D*
**PCs and Expert Systems: Costs/Benefits**
*Friday, July 11, 12:00-12:50, Room E*
**Handling Dissimilar Data Using a Chart of Accounts**
*Friday, July 11, 1:00-2:20, Room A*
**What Makes an Information Center Tick?**
*Friday, July 11, 1:00-1:50, Room C*
**Computer Security: Is Your System Safe and Sound?**
*Friday, July 11, 1:00-2:20, Room D*
**LANs: Assessing User Needs**
*Friday, July 11, 1:00-2:20, Room E*
**Micro-to-Minicomputer Communications: An Overview**
*Friday, July 11, 2:10-4:00, Room A*
**Beyond Keyboard Entry: Options in Data Input**
*Friday, July 11, 2:30-4:00, Room C*
**CAD/CAM, Candidly**
*Friday, July 11, 2:30-4:00, Room D*
**Memory Storage: Past Dreams/Future Visions**
*Friday, July 11, 2:30-4:00, Room E*
**The Revolution in PC Publishing**

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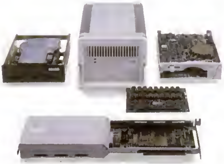

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# U.S. vendors find rules different

From page 174

German customers are also very different from U.S. buyers, according to Imai-Alexandra Roehreke, public relations manager at Digital Equipment Corp.'s West German subsidiary. "They need more hand-holding, more pampering," she explains.

Martin Judd, a vice-president at software firm MSA International, Inc., a subsidiary of Management Science America, Inc., noted that in Asia, "You've got to tailor your approach to each market. Unless you realize that committees make decisions, you will be in trouble. Never pressurize an individual, or single him out for special treatment."

**British less adventurous**

Some U.S. software vendors, Small says, fail to appreciate that British users, besides being less adventurous than their transatlantic cousins, also have less cash to spend than do most U.S. firms.

"American companies selling big banking packages have had problems," he says. "Equivalent American users have computers two or three times as powerful because, unlike the British, they are doing real-time updating. The suppliers have found that UK companies can't afford computers big enough to run their packages," Small says.

The suppliers themselves often must do more with less when it comes to their European marketing campaigns. "The issue is quality vs. quantity in our marketing since budgets are tight," observes Giuseppe Tagliabue, marketing manager at DEC's Italian subsidiary.

In one response to this challenge, DEC supplies computer equipment to Ferrari's racing department, thereby teaming up with one of Italy's best known car manufacturers in a partnership that provides DEC with high visibility at little cost.

Beppe Ugolotti, marketing manager at Apollo Computer, Inc.'s Italian office, notes that print advertising in Italy differs in content from that in the U.S. "In the U.S., you can use dramatic advertisements that set a mood. But in Italy, advertisements must be more conservative, practical and to the point," he says.

**Translating software a headache**

Modifying software for different markets and translating manuals and screen displays from English is a major headache for many companies. "We have a six-month time lag in the translation of software," says Max Uwe Ferck, marketing communications manager for Wang Laboratories, Inc. in West Germany. "We aren't able to offer a new product right away because we have to translate the literature."

U.S. software developers often forget that their products may find their way to Munich, West Germany, Paris or Madrid. "If you are creating software in the U.S., think international when you're writing it," says Andrew Thorburn, European Group president of U.S.-headquartered Lexitech, Inc., a service firm specializing in the translation and localization of software and documentation.

Some European firms that market OEM U.S. software packages, such as International Computers Ltd. in the UK, are passing translation burdens back to the developers, according to Thorburn.

**Use local experts**

To untangle the web of foreign particularities, U.S. firms often turn to local agents or distributors. In Italy, some U.S. companies, including Wang and Texas Instruments, Inc., prefer to use Italian public relations firms for all advertising, marketing and press relations, relying on local experts familiar with the national market.

But in Europe, U.S. companies appear to be overcoming most of the cultural hurdles. The UK's trade deficit in computer products, for example, is now running at over $2.5 billion per year, compared with $280 million in 1978. The bulk of imports come from the U.S.

An Wang, chairman of Wang Laboratories, recently predicted that European sales will contribute a third of Wang's total revenue by the middle of the 1990s, up from one-fifth last year.

# Televideo breaks even despite low quarterly sales

SAN JOSE, Calif. — Televideo Systems, Inc. continued its struggle in the competitive terminals market, announcing break-even results for the second quarter ended May 2.

Sales during the quarter dropped to $20.8 million from $26 million a year ago. Profits were $19,000, or zero cents per share, compared with a loss of $678,000, or minus two cents a share, for the same period a year ago.

Sales for the year are down 18% from last year, while profits inched up to $322,000, up from an $8.7 million loss of a year ago.

Once a leader in the ASCII terminal market with sales of more than $168 million in 1983, Televideo began losing ground when it diversified its product line and concentrated heavily on producing an IBM Personal Computer clone.

The company lost $19 million on sales of $102 million during fiscal

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See page 144

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* Source: A Profile of Computerworld Readers and Their Organizations, STAT Resources, August 1984

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EPSON LQ-1000 $729
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JUKI 6300 $699
NEC 3550 $899
OKIDATA 192 $379
OKIDATA 193 $519
TI 865 $1025
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TOSHIBA P341 $829
TOSHIBA P351 $1069

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**Alpha Software** *(not copy-protected)*
✓Keyworks 2.0 ... $49.
**Ashton-Tate** *(copy-protected)*
✓dBase III Plus 1.0 ... call.
✓Framework II 1.0 ... call.
**Best Programs** *(not copy-protected)*
✓PC/Tax Cut *(1986 version for 1985 taxes)* 119.
✓PC/Fixed Asset System 3.1 ... 299.
**Bible Research** *(not copy-protected)*
✓THE WORD 3.1 *(KJV Bible)* ... 159.
✓THE WORD 3.1 *(NIV Bible)* ... 159.
**Borland International** *(not copy-protected)*
✓Turbo Tutor 1.0 ... 19.
✓Turbo Database Toolbox 1.2 ... 33.
✓Turbo Graphix Toolbox 1.0 ... 33.
✓Turbo Editor Toolbox 1.0 ... 41.
✓Turbo Gameworks 1.0 ... 37.
✓Turbo Newpak *(Gameworks and Editor)* ... 52.
✓Turbo Lightning ... 57.
✓Sidekick 1.5 ... 49.
✓Traveling Sidekick *(req. Sidekick)* ... 45.
✓Traveling Sidekick w/Sidekick ... 73.
✓Reflex 1.1 ... 59.
✓Superkey 1.1 ... 41.
✓Superkey/Sidekick Package ... 67.
✓Turbo Pascal 3.0 ... 41.
✓Turbo Prolog 1.0 ... 65.
✓Turbo Holiday Pack *(Pascal 3.0, Tutor, and Database Toolbox)* 67.
✓Turbo Family Jumbo Pack *(Pascal 3.0, Database, Editor & Graphix Toolboxes, Tutor and Gameworks)* ... 135.
**Breakthrough** *(not copy-protected)*
✓Timeline 2.0 ... 239.
**Broderbund** *(copy-protected)*
✓Graphics Library 1 ... 22.
✓Print Shop ... 35.
**Computer Associates** *(not copy-protected)*
✓SuperCalc 3 Release 2.1 ... call
**Dac Software** *(not copy-protected)*
✓Dac Easy Accounting ... 45.
**Evergreen** *(not copy-protected)*
✓One Write Plus 1.01 ... 159.
**Executive Systems** *(not copy-protected)*
✓XTREE 2.0 *(file & directory manager)* ... 37.
**5th Generation** *(copy-protected)*
✓Fastback 5.03 ... 97.
**Funk Software** *(not copy-protected)*
✓Sideways 3.11 ... 39.
**Infocom** *(not copy-protected)*
✓Cornerstone 5.1 ... 65.
**Lifetree** *(not copy-protected)*
✓Volkswriter 3 1.0 ... 147.
**Living Videotext**
✓ThinkTank 2.1 *(copy-protected)* ... 105.
✓Ready 1.0 *(not copy-protected)* ... 49.
**Micro Education (MECA)** *(copy-protected)*
✓Managing Your Money 2.0 ... 115
**Micropro** *(not copy-protected)*
✓WordStar 3 31 ... 179.
✓WordStar 2000 Plus Release 2 ... 285
**Microrim** *(not copy-protected)*
✓Extended Report Writer 1.3 ... 85.
✓Clout 2 0 ... 135.
✓R:base 5000 1.01 ... 359.
✓R:base 5000 Multi-user 1.0 ... 719.
**Microsoft** *(not copy-protected)*
✓Multiplan 2.0 ... 119.
✓Microsoft Word 3.0 ... 247.
✓Windows 1.01 ... 65.
✓Quick Basic 1.02 ... 69.
✓Project 2.0 ... 239.
**Microstuf** *(not copy-protected)*
✓Crosstalk XVI 3 61 ... 95.
✓Remote 1 3 ... 95.
**Migent Software** *(not copy-protected)*
✓Ability 1.0A ... $65.
**MultiMate International** *(not copy-protected)*
✓MultiMate 3.31 ... call
✓MultiMate Advantage 3.6 ... 269.
**Nantucket Software** *(copy-protected)*
✓Clipper *(Winter '85 version)* ... 349.
**Paperback Software** *(copy-protected)*
✓VP-Planner 1.0 ... 57.
**Peter Norton** *(not copy-protected)*
✓Norton Commander 1.0 ... 36.
✓Norton Utilities 3.1 ... 59.
**Quarterdeck** *(not copy-protected)*
✓DESQView 1.2 ... 65.
**Satellite Software** *(not copy-protected)*
✓WordPerfect 4.1 ... 239.
**Software Group** *(not copy-protected)*
✓Enable 1.1 ... call
**Software Publishing** *(copy-protected)*
✓PFS:File B:01 ... 84.
✓PFS:Write C:01 ... 84.
✓Harvard Total Project Manager 1.1 ... 289.
Not copy-protected versions due to be released soon—*call.*

## TRAINING

**ATI** *(copy-protected)*
✓*SKILL BUILDER PROGRAMS*
Intro and How to Use:

| | | |
|---|---|---|
| Data Bases | MS-DOS | |
| Compaq | PC-DOS | |
| IBM-PC | BASIC | ... *each* 33. |

✓*TRAINING POWER PROGRAMS*
How to Use:

| | | |
|---|---|---|
| dBase II | dBase III | Lotus 1-2-3 |
| Multimate | Framework | Displaywrite 3 |
| Multiplan | Wordstar | |
| WordPerfect | Symphony | ... *each* 43. |

**Individual Software** *(copy-protected)*
✓The Instructor II ... 26.
✓Professor DOS ... 33.
✓Tutorial Set *(both items above)* ... 49.
✓Typing Instructor ... 26.
✓Training for Lotus 1-2-3 *(for vers. 1A & 2)* ... 37.
✓Training for dBase III ... 37.

## HARDWARE

Manufacturer's minimum limited warranty period is listed after each company name. Some products in their line may have longer warranty periods.

**AST Research** *(1 to 2 years)*
SixPakPlus 64k *includes Sidekick vers. 1.5 not copy-protected & DESQView* ... 169.
SixPakPlus 384k *(fully populated)* ... 219.
✓AST-5251-11 ... 579.
✓AST-3780 ... 579.
✓Advantage 128k ... 369.
RAMpage! *upgrades to 2Mb* ... call
✓RAMpage! AT *upgrades to 2Mb* ... call
*Both RAMpage boards support EMS and fully support EEMS.*
**Amdek** *(2 years)*
✓Video 310A mono monitor *(amber)* ... 159.
✓Color 722 - RGB *(EGA compatible)* ... 519.
**Curtis** *(lifetime)*
*ACCESSORIES*
✓Low Profile Tilt and Swivel Pedestal ... 25.
✓PC Pedestal *(for IBM Mono or Color)* ... 27.
Portable Pedestal *(for portable computers)* 36.
✓Printer Stand ... 18.
System Stand *(for IBM-PC & XT)* ... 19.
✓Universal System Stand ... 25.
*CABLES*
Smartmodem to IBM Cable ... 17.
✓Keyboard Extension Cable *(3 to 9 feet)* ... 27.
✓Extension Cables for IBM Mono Display ... 33.
*SURGE SUPPRESSORS*
✓Diamond *(6 outlets)* ... 29.
✓Emerald *(6 outlets; 6 ft cord)* ... 36.
✓Sapphire *(3 outlets; EMI/RFI filtered)* ... $47.
✓Ruby *(6 outlets; EMI/RFI filtered; 6 ft cord)* 55.
✓Command Center ... SPECIAL ... 79.
**DCA** *(1 year)*
✓Smart Alec ... 639.
✓Irma ... 769.
**Epson** *(1 year)*
*We are an authorized Epson service center.*
✓LX-80 printer *(80 column)* ... call
✓FX-85 printer *(80 column)* ... call
✓FX-286 printer *(136 column)* ... call
✓LQ-800 printer *(80 column)* ... call
✓LQ-1000 printer *(136 column)* ... call
**Hayes** *(2 years)*
✓Smartmodem 300 ... 139.
✓Smartmodem 1200 ... 389.
✓Smartmodem 1200B *(w/Smartcom II)* ... 349.
✓Smartmodem 2400 ... 579.
✓Smartmodem 2400B *(w/Smartcom II)* ... 539.
✓Smartcom II 2.1 *(software)* ... 69.
**Hercules** *(2 years)*
✓Hercules Color Card *(parallel port)* ... 159.
✓Hercules Graphics Card *(parallel port)* ... 299.
**Intel** *(chips: 1 year; boards: 5 years)*
Above Board PC 64k *(upgrades to 2 Meg)* call
✓Above Board AT 128k *(upgrades to 2 Meg)* call
Above Board PS 64k C/S/P *(upgrades to 1.5 Meg)* ... call
8087 *(for IBM-PC & XT)* ... 129.
8087-2 *(works on 8 Mhz computers)* ... 177.
✓80287 *(for 6 MHz IBM-PC AT)* ... 225.
✓80287-8 *(for 8 MHz IBM-PC AT)* ... 269.
**Kensington Microware** *(1 year)*
✓Masterpiece ... 94.
**key tronic** *(90 days)*
5151 keyboard *(deluxe)* ... 169.
✓5153 keyboard *(with touch pad)* ... 279.
**Mouse Systems** *(3 years)*
✓PC Mouse with PC Paint+ ... 139.
✓PC Mouse with Ready and PC Paint+ ... 149.
**NEC** *(90 days)*
✓Multisync monitor *(EGA compatible)* ... 549.
**Orchid Technologies** *(1 to 2 years)*
Conquest Multifunction Board Øk *upgrades to 2Mb, fully supports LOTUS/INTEL expanded memory specification (EMS)* ... 264.
Tiny Turbo 286 ... 459.
PC Turbo 286e w/1 Meg ... 749.
✓Eccell Multifunction Board for the AT Øk *upgrades to 1 Meg, fully supports LOTUS/INTEL expanded memory specification (EMS) and Error Correction Code (ECC), serial and parallel ports optional* ... 399.
**Paradise Systems** *(1 year)*
✓Color/Mono Card ... 149.
✓Modular Graphics Card ... 275.
**Princeton Graphics** *(1 year)*
✓MAX-12E Amber monochrome monitor ... 179.
✓HX-12 RGB monitor *(690 x 240)* ... 449.
**Quadram** *(1 to 2 years)*
Expanded Quadboard Øk *(upgrades to 384k)* ... 169.
384k *(fully populated)* ... 219.
Silver Quadboard Øk *(upgrades to 576k)* 249.
✓Microfazer Printer buffer *(parallel) w/copy MP 64 (64k) upgrades to 512k* ... 159.
✓QuadEGA+ *(half-card)* ... 369.
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PC-Documate Keyboard Templates *available for:*

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| ✓DOS/Basic 3.0-3.1 | WordStar |
| ✓Lotus 1-2-3 | ✓WordStar 2000 |
| ✓Symphony | Turbo Pascal |
| Framework | ✓WordPerfect |
| dBase II | ✓dBase III |

✓MultiMate ... *each* 12.
**Toshiba** *(90 days)*
*All Toshiba printers listed are 24 pin dot matrix.*
✓P321 serial/parallel printer *(80 col.)* ... 519.
✓P351 serial/parallel printer *(136 col.)* ... 1089.
**Video 7** *(2 years)*
✓VEGA *(half-card)* ... 369

## DRIVES

**IOMEGA** *(90 days)*
✓Bernoulli Box 20 Meg w/PC2 card ... $1999.
✓10 Meg cartridge ... 51.
✓Bernoulli Box 40 Meg w/PC2 card ... 2499.
✓20 Meg cartridge ... 69.
**Mountain Computer** *(1 year)*
Drive Card 20 Meg ... call
**PC Connection** *(1 year)*
20 Meg Hard Drive Card ... 489.
**Seagate** *(1 year)*
20 Meg Internal Hard Drive *(w/controller and cables)* ... 449.
**Toshiba** *(90 days)*
PC, XT 360k Drive *(5¼" half-height)* ... 109.
✓AT 360k Drive *(5¼" half-height)* ... 117.

## MEMORY

64k Memory Upgrade Set for IBM-PC or XT system board or any memory board
150 nanosecond *(set of 9)* ... 15.
200 nanosecond *(set of 9)* ... 12.
✓128k Memory Upgrade Set for IBM-AT System Board *(9 chips piggybacked)* ... 39.
✓256k Memory Upgrade Set for any IBM-AT memory board *(9 chips)* ... 39.

## DISKS

All disks have a lifetime warranty.
**DS/DD Disks** for the PC & XT (40 TPI).
*10 disks per box.*
✓Verbatim Datalife ... 17.
✓Maxell MD-2 ... 19.
**DS/High Density Disks** for the AT (96 TPI).
*10 disks per box.*
✓Fuji ... 27.
✓Maxell ... 34.
✓Verbatim ... 34.

✓Flip Sort *(holds 75 disks)* ... 15.
✓**Floppiclene** Disk Drive Cleaner *(5¼")* ... 18.

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# Jubilation

## Word-a-holics unite!

Trying to decide which word processor to buy is like trying to decide which college to go to. The decision will change your life forever, but you may never know if it was the best one. Here are five tried and proven professional packages. They all have spell checkers. None are copy-protected. And hard drives are recommended for all. See PC Magazine 1/28.

ON-FILE
graphlink
multimate advantage
MICROSOFT
Microsoft Word
WordPerfect
volkswriter 3

**MultiMate Advantage 3.6 with Graphlink and On-File** ...... **$269**
Originally designed to emulate the WANG word processor, MultiMate is often referred to as the corporate word processor. It offers sophisticated networking capabilities, and, with two free-for-a-limited-time software programs (Graphlink and On-File), also has built in graphics and database.

**MicroSoft Word 3.0 with Outline** .................. **$247**
With a mouse and a graphics card, MicroSoft Word lets you move words around without touching the keyboard, and see what you got without squinting. Without a mouse or a graphics card it's still a powerful word-processor, with "Style Sheets" that simplify formatting, and a built-in outline program.

**WordPerfect 4.1** ...................... **$239**
We have a friend who writes for computer magazines. At one time or another he has used and reviewed virtually every major word processor. He now swears by WordPerfect and swears at all the others. Use this program for a while and you'll be able to touch type most of your commands with your eyes closed and your right hand tied behind your back.

**WordStar 2000 Plus Release 2** ................ **$285**
WordStar has had some trouble shedding its image as the lumbering dinosaur of the microcomputer age. But hundreds of thousands of people use it. There are a lot of programs out there to back it up. And this new version gives it the same advanced features as any top-quality word processor. Even the control keys are starting to make some sense.

**Volkswriter 3.0** ........................ **$147**
Solid performance with a reasonable price continues to be Volkswriter's claim to fame. It's fast, and boasts one of the original what-you-see-is-what-you-get screens. With the new version's spell checker and more sophisticated print formatting, it is now able to compete functionally with the other high-end word processors. (Our new low price is pretty persuasive too).

## Buy one. Get two.

Hey, got a friend? Don't know? Check your database! What? No database? Have we got a deal for you (and your friend). Until June 30, Microrim will send you a *complete* second copy of R:base 5000 free when you send in your warranty card and a copy of our sales invoice. So you can get together with your friend, split the cost for one and get two! Or, you can keep the extra copy at home, at a branch office, or down the hall. R:base 5000 is easy to learn and operate, and has the custom reporting features most users need.
Remember, the two for one offer is only good from April 15 till June 30.

**R:base 5000** ............. **$359**
(Additional R:base 5000 from Microrim) ........ $Free

## Chips

Fully tested, factory fresh 9-chip sets from the leading chip manufacturers, such as TI, Samsung, NEC, Hitachi, Oki, etc. All chips and chip sets come with complete instructions.

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| **64K** (200Ns) | **$12 ea. set** |
| **64K** (150Ns) | $15 ea. set |
| **128k** or **256k** (150Ns) | $39 ea. set |

## Bernoulli Berserk!

We've got a problem. The prices we're able to offer on Bernoulli boxes are changing about 10 times faster than we can change this ad. Probably because the machines are selling about 10 times faster than anyone ever dreamed they would. The 20 Meg and 40 Meg versions feature two ½ height drives with removable cartridges. There's a 90 day warranty, and we're an authorized Bernoulli service center—turnaround on repairs is usually 24 hours. Here are our latest up-to-date-but-probably-obsolete-by-now prices!

**Bernoulli Box 40 Meg** ............. **$2499**
Additional 20 Meg Cartridges ............... $69
Bernoulli Box 20 Meg ........ $1999
Additional 10 Meg cartridges ............... $51
Bernoulli Care Kit ........ $79

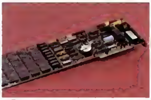
## Supercalc ifragilistic!

SuperCalc 3

SuperCalc 3 is the kind of product that you'd be proud to bring home to your mother. Like Lotus 1-2-3 it offers spreadsheet, information management and presentation graphics. But it only needs 128k of RAM, and is not copy-protected. It also is compatible with the Hercules Monochrome Card, as well as the Enhanced Memory (EMS) and Enhanced Graphics (EGA) standards. And you get a free copy of Sideways, the program that lets your printer think horizontal is vertical.

**SuperCalc 3 2.1 (with Sideways)** ..................
**30% off our usual unusual low price—call!**

## SixPakPlus Minus$!



AST is so wrapped up in Enhanced Memory and other arcane subjects that they've been letting the price slip on their original claim to fame—the AST SixPakPlus, one of the original and best multifunction cards. So if you're just starting in computing, or outfitting a second unit for home, now's a great time to buy this basic piece of hardware. You get a clock calendar, serial port, parallel port, up to 384k of memory, *and* copies of two classic unprotected programs—Sidekick 1.5 and DESQView. A genuine deal.

**SixPakPlus 64k** ....... **$169**
SixPakPlus 384k (fully populated) ........ $219

## Herculean rebate!

The Hercules monochrome graphics card has saved hundreds of thousands of PC owners from terminal myopia, by supplying crisp clean monochrome graphics. The Hercules color card is the industry standard for color graphics. Both come with a parallel printer port, and a *full two year warranty*. And from May 1 through August 31, Hercules is offering a $50 rebate on either card.

**Hercules Monochrome Graphics Card** ........ **$299**
(and get $50 rebate from Hercules)
Hercules Color Card (1/2 slot) .... $159
(and get $50 rebate from Hercules)

## Disks (10 per box)

**IBM-PC disks Verbatim DataLife (DS/DD) (limited time offer! 12 disks for the price of 10)** ......... **$17**
**IBM-AT disks (96-TPI)**
Verbatim DataLife ........ $34
Maxell ........ $34
Fuji ........ $27
(Floppiclene 5¼" Head Cleaner) ...... $18

## Tip Sheet

**Name:** Jennifer Aiken
**Title:** Sales Representative
**Claim to fame:** Has eaten several pints of Ben & Jerry's White Russian ice cream at a single sitting.

"What do you mean your PC's too slow? Manual typewriters are slow. Doing spreadsheets by hand—that's slow. Admit it. When you first got your PC you thought it was the fastest thing you'd seen since high school. Ah, but the bloom is off the rose, as it were. And now you can't bear wasting those precious milliseconds. When you start a search, or a merge and purge, or a spreadsheet revision you want the thing done faster than you can say "Gimme!"

Well, o'kay. We understand. We can help. You need a processor with a faster clock speed. You're probably limping along at the PC's (or XT's) 4.77 MHz or the AT's 6 MHz. Whereas virtually every program on the market is ready to rip through RAM at 8 MHz or faster. Hey, speed kills, but it sure saves time. Go for it. Get fast. Get megafast. Give us a call and ask us about Orchid Technology's line of Turbo Boards. Don't wait."

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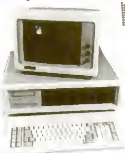

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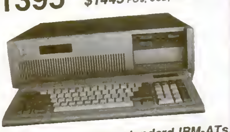

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10 meg. $399

20 meg. $419 Cashier's check, MC/VISA

$439 COD, POs Net Terms

30 meg. $575

AT Multifunction Card . $179

2 serial, 1 parallel ports. Will hold up to 2 Meg. of memory (2048K).

256K Memory. . . . . . . $29

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2 meg. (8 sets) . . . . . $232

| | |
|---|---|
| Panasonic 1080 | $225 |
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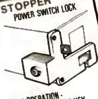

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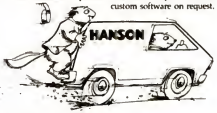

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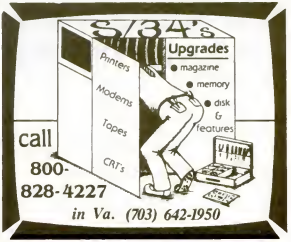

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## PROGRAMMER ANALYST

You will develop functional requirements and documentation based on accepted user criteria, prepare system test procedures, and work independently on complex projects related to specific phases of application programming. Three years programming experience with two years in systems development using COBOL is required. (Job Code 700-2)

For **Sr. Programmer Analyst and Programmer Analyst** positions, a Bachelor's degree or equivalent in Computer Science, Math, Engineering or Business is preferred. Previous experience with large-scale IBM systems and IMS DB/DC required; experience in distributed data processing systems a plus.

## DATA BASE ADMINISTRATION ANALYST

You will design and install IMS data bases for large-scale IBM systems. You must have a minimum of three years experience with two years in systems development and IMS DB/DC experience. Experience preferred in: Monitoring data bases for performance; logical and physical data base design, data base reorganization and recovery procedures and utilities; PSB and DBD creation. **Positions available in Memphis and Colorado Springs.** (Job Code 700-3)

## QUALITY ASSURANCE ANALYST

You will participate in the development of a quality assurance function to include such areas as: Change control, system test, monitoring of standards and procedures, implementation of a structured methodology and system design reviews. You must have a minimum of three years data processing experience with two years in systems development using COBOL and strong interpersonal skills. IMS knowledge and experience with systems test, design reviews, change control or structured methodology preferred (Yourdon). **Positions available in Memphis and Colorado Springs.** (Job Code 700-4)

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You will consult and plan configurations and ensure appropriate hardware/software support for our large ACF/VTAM, ACF/NCP network, supporting such products as NCCF, NTO, NPM, and MSNF. You must have five years data processing, including three years experience in system software support and a working knowledge of MVS, VTAM, NCP, Assembler, and communication hardware concepts. COBOL programming skills and knowledge of communication protocols are preferred. (Job Code 700-6)

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You will be responsible for performance analysis of each major system's DASD configuration and improvement recommendations using MICS, SMF/RMF, OMEGAMON, RESOLVE, TESTDATA response time monitor, BEST1, MAP and CMS models. You must have seven years programming experience, including five years in systems programming for large IBM mainframes and demonstrated technical skills in implementing major IBM systems software. A Bachelor's degree or equivalent in a computer related field and experience with the above mentioned tools are preferred. (Job Code 700-7)

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You will be assisting on configuration, performance, space management and all phases of DASD utilization. You must have three years data processing experience with at least one year in DASD management in a large IBM shop. Must be able to use UCC-3, DMS, or HSM. Systems programming experience a plus. Strong JCL skills required. (Job Code 700-8)

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Due to our rapid growth, we are consolidating and redesigning our order processing and other corporate information systems to support our One Billion Dollar sales volume! We are seeking ambitious, experienced Data Processing Professionals to grow with us.

### *SYSTEMS DEVELOPMENT MANAGERS*

Candidates should be college degreed with extensive MIS experience and at least 4-5 years in a managerial role. A demonstrated track record of Project Management with experience in high volume Order Processing, Fulfillment and Inventory Management a must. The work environment is a large scale computer system, MVS, CICS and COBOL. Exposure to ADABAS and DB2 are a plus.

### *SR. SYSTEMS ANALYST*

The ideal candidates will have a minimum of 5 years COBOL programming and systems design experience in an IBM OS/MVS environment with a background in general business applications with an emphasis in order processing and inventory control.

- CICS, JCL experience required; TSO and database experience with ADABAS and DB2 desirable
- Good interpersonal skills combined with a college degree qualify you for consideration

### *TECHNICAL SUPPORT SPECIALISTS*

Individuals with a minimum of 5 years MIS experience are needed to provide guidance and support to the applications development staff in the areas of application design, database, CICS, TSO, and JCL.

- Strong COBOL, MVS, CICS, TSO, and JCL skills and database experience required
- Must be able to work independently; a degree in Computer Science or related discipline a requirement

### *PROGRAMMERS & PROGRAMMER ANALYSTS*

A number of positions are available at various levels of experience and responsibility. Qualified candidates should meet these requirements:

- Minimum 2 years COBOL programming experience in an IBM OS/MVS environment required
- Working knowledge of CICS and JCL required.
- TSO and database experience desirable.

These positions will be located at our Prentice-Hall facility in Old Tappan, NJ. We offer not only a competitive benefit package and starting salary, but an opportunity for professional and career growth

## 1000 DP Openings

| | |
|---|---|
| MVS Sys Prog (1 yr) | 27-40K |
| CICS Sys Prog (2 yrs DOS/MVS or DOS/VSE) | 27-40K |
| VTAM/NCP Sys Prog (2 yrs) | 26-39K |
| IMS or IDMS Sys Prog (2 yrs) | 25-38K |
| DEC Sys Prog (2 yrs VAX or PDP 11) | 25-40K |
| ADABAS/Natural Prog Anal (2 yrs) | 27-40K |
| IMS DB/DC Prog Anal (5 yrs) | 25-36K |
| CICS or IDMS Prog Anal (2 yrs MVS or DOS) | 25-35K |
| Assembler Programmer (2 yrs IBM) | 25-30K |
| Honey L/66 Prog Anal Sys Anal (2 yrs) | 23-33K |
| Sys 38 Prog Anal (2 yrs Mfg or Acct Apps) | 24-33K |
| Tandem Prog Anal (2 yrs) | 24-35K |
| Burr 6800 Prog Anal (2 yrs Mfg or Acct Apps) | 25-38K |
| Univac 1100 Prog Anal (2 yrs DMS 1100) | 23-32K |
| HP 3000 Prog Anal (2 yrs) | 25-30K |
| Sys Anal Mfg, Acct or Dist Apps | 28-39K |
| Insurance Prog Anal (1 yr Ins Apps) | 20-30K |
| Bank Prog Anal Sys Anal (2 yrs Bank Apps) | 22-33K |
| Mfg Prog Anal Sys Anal (2 yrs Mfg Apps) | 25-39K |
| DEC Software Engr (2 yrs VAX or PDP 11) | 25-35K |
| Software Engr (2 yrs Z80 8080 or 6800) | 25-40K |
| Software Engr (2 yrs UNIX "C") | 25-35K |
| Electronic Warfare Software Engr (2 yrs) | 25-40K |
| Data Base Anal (2 yrs IMS IDMS or ADABAS) | 30-45K |
| EDP Auditor (2 yrs EDP Audit IBM) | 26-33K |

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Cherry Hill, New Jersey 08002
[illegible]

**RSVP SERVICES, Dept. C**
Suite 201, Dublin Hall
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[illegible]

POSITION ANNOUNCEMENTS

## SOFTWARE ENGINEERS

Advanced Programming Resolutions, Inc., a dynamic, growth-oriented, computer consulting company specializing in UNIX/C, operating systems, speech recognition, and graphics applications, has expanded its Columbus based-operation to include Chicago.

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  - UNIX internals
  - MS-DOS internals and LAN of PC's
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  - Digital Design Background and Analog Circuit Design

**OUR SUCCESS IS OUR PEOPLE!**

Please submit your resume to:

**Robert D. Williams, Corporate Recruiter**
**Advanced Programming Resolutions, Inc.**
**2715 Tuller Parkway Drive**
**Dublin, Ohio 43017**
**(614) 766 6901**

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APR

## Director Of Administrative Computing Center

State University of New York College at Oswego invites applications for the position of Director of its Administrative Computer Center.

Responsible to the Executive Vice President/-Provost and Supervisor of fifteen employees the Director is responsible for overall policy and planning of the Administrative Computing Center. It is anticipated that the Burroughs system which is currently in use will be replaced within the next two years. The Director will complete the selection of new hardware and be responsible for the implementation of an integrated management information system. In addition to assisting administrative users and developing an online database he/she will serve as one of the principle Advisors to the Provost and faculty in the development of campus computing resources.

The candidate will have an appropriate degree and three years experience working with higher education management information systems. A Masters is preferred. Candidates should possess excellent communications skills and have proven management and leadership qualities. Salary is competitive and commensurate with experience. The starting date is negotiable.

Please submit a letter of application, resume and three letters of reference to **Dr. Donald R. Mathieu, Executive Vice President/Provost, SUNY College at Oswego, Oswego, New York 13126**. Deadline for applications is July 21st, 1986. SUNYCO is an Equal Opportunity/Affirmative Action Employer

## CONTRACTORS

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- ADABAS
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- S38 S36
- HP
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- MSA

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## COBOL PROG. ANALYST

Rapidly expanding MVS shop in St Louis has several positions available for experienced COBOL Applications Programmer Analysts to develop business, financial and retail applications. Will use CICS and database methods, and have a good mix of programming and analysis. This is an opportunity to get your career moving with more responsibility and involvement. Salary to $35,000.

ROBERT HALF

POSITION ANNOUNCEMENTS POSITION ANNOUNCEMENTS POSITION ANNOUNCEMENTS POSITION ANNOUNCEMENTS

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GTE Government Systems takes you beyond the entrepreneurial spirit. We back up your initiative and enthusiasm with the resources of one of America's largest corporations. Consequently our people not only feel free to strive for innovative solutions, they also have the opportunity to see their ideas at work in the real world.

Put your talents to work at any one of the many diverse GTE Government Systems areas of specialization. Accept the challenges presented by artificial intelligence, signal processing, voice technology, lasers, and VLSI. Work on key defense programs employing Ada and other new languages. Participate in design and engineering projects which cross the borders of the impossible.

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Some of the current career opportunities at GTE Government Systems include:

**SYSTEMS ENGINEERING**

We are seeking Systems Engineers and Technical Managers for:

- High-speed digital communication systems, TDMA/TDM/PCM
- Spread spectrum communication systems
- Mission planning and control systems
- EW/ESM/ECM systems
- AI/Expert systems
- Direction-finding subsystems
- Receiving and Processing subsystems
- Real-time processing
- Signal analysis
- RF tracking systems
- Over-the-horizon radar

**DIGITAL HARDWARE ENGINEERING**

- VHSIC/VLSI design
- Digital design
- Digital signal processing
- Microprocessor hardware/software
- Communications signal processing

**RF HARDWARE ENGINEERING**

- State-of-the-art microwave component design
- High power component design for RF transmitter

- Leadership opportunities targeting technology developments
- System applications requiring creative hardware design contributions

**MECHANICAL ENGINEERING**

- Electro-mechanical packaging and miniaturization
- EMI/TEMPEST packaging
- Thermal/structure design and analysis
- Project Management

MIL-SPEC experience required.

**SOFTWARE ENGINEERING**

Opportunities exist for skilled software engineers across a full range of defense system applications using development systems such as DEC/VAX 8600 and MicroVAX II, PDP 11 series, and the Hewlett-Packard 1000. Microprocessor applications are directed to Intel 8085/8086, TI 32020, and Motorola 68000 processors. We are seeking senior people in the following areas:

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  Use the DEC/VAX and MicroVAX II in our advanced development facility to build systems requiring:
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  —Relational DBMS
  —Networking on ETHERNET/VAX clusters
  —Large system development (300,000 lines of source code)
  —Microprocessor applications (Motorola 68020)
- **FIXED AND AIR-SEA-LAND MOBILE SYSTEMS**
  Interdisciplinary software/firmware/hardware teams build systems from high-level design through final test and integration using skills in:
  —Microprocessor applications
  —Real-time analysis and control
  —Test-bed development and analysis
  —Mapping and graphics displays
  —Man-machine interfacing
  —Concurrent processing
  —Software architecture design
  —Data base design and applications
  —AI/Expert systems

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GTE Government Systems

## SYSTEMS ANALYSTS

The Office of Management Design, an internal consulting group in NYC's Human Resources Administration is recruiting 2 individuals to analyze office automation and decision support systems needs, and formulate and implement appropriate solutions. Candidates should be knowledgeable and experienced in one or more of the following areas: Systems Analysis within manual/computer-based environments, system specification and implementation, project management techniques, decision support systems design and technologies, software package evaluation, micro/mini/mainframe communications, office automation architectures and technologies, and user/management presentations. Positions require a minimum of 3 years management or systems analysis experience and solid analytical and communication skills. Programming skills are not required. Salary range: low to mid 30's. NYC residency required. Send resume with cover letter to: Ms. Delespara, Office of

## OHIO, KY, IND

| | |
|---|---|
| MVS Sys Prog (2 yrs) | 30-40K |
| IDMS Sys Prog (2 yrs) | 38-47K |
| IDMS ADSO P/A, S/A (2 yrs) | 25-36K |
| MVS + VTAM Sys/Prog (4 yrs) | 40-49K |
| Network Control (2 yrs) | 30-42K |
| CICS Prog/Anal (2 yrs MVS or DOS) | 26-36K |
| BURR Prog/Anal (4 yrs) | 31-40K |
| Insurance P/A (1 yr Life or Prop) | 25-33K |
| HONEY Prog/Anal (1 yr GCOS) | 24-32K |
| HP3000 Prog/Anal (2 yrs) | 24-31K |
| TANDEM Prog/Anal (2 yrs TAL) | 27-33K |
| HP1000 Prog/Anal (1 yr Fortran) | 25-34K |
| CRAY Analyst (3 yrs) | 40-45K |
| PL-1 Prog/Anal (2 yrs) | 24-30K |
| BANK P/A (2 yrs) | 24-32K |
| Sys 38 P/A (2 yrs) | 25-35K |
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## CLIENT SUPPORT REPRESENTATIVE - LOANS

Financial data processing company located in downtown Orlando, Florida is seeking an individual with 2-3 years Systematics Software experience, knowledge of financial data processing applications in the area of commercial and mortgage loans. Excellent written, verbal and customer contact skills, some travel, supervisory skills a plus. Managerial or supervisory experience a definite plus.

We offer a competitive salary and excellent company benefits. Send resume and salary history to:

**A. Simpson, Human Resources**
**FLORIDA INFORMANAGEMENT SERVICES, INC.**

POSITION ANNOUNCEMENTS

# PROGRAMMER

*(Work Location: Las Vegas, Nevada)*

These positions require a Bachelor's Degree in Business Administration, Mathematics, Engineering, Computer Science, or related fields. Must have two or more years of applicable systems analysis and programming experience, to include COBOL and POWERHOUSE programming on HP 3000 Computer using IMAGE database. Should be able to communicate effectively with business and engineering people and have a solid foundation in structured methods of design and programming.

# SYSTEMS ANALYST/ PROGRAMMER

*(Work Location: Mercury and Tonopah, Nevada)*

These positions require a Bachelor's Degree in Business Administration, Mathematics, Engineering, Computer Science, or related fields. Must have two or more years of applicable systems analysis and programming experience, to include COBOL and/or FORTRAN programming on time-sharing systems. IBM or DEC experi -ence preferred. Should be able to communicate effectively with business and engineering people and have a solid foundation in structured methods of design and programming.

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- Combat Systems Engineering
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Tony Huguely
19570 Clubhouse Rd
Gaithersburg, MD 20879

David Popa, Suite 2A
Princeton Meadows Office
Plainsboro, NJ 08536

POSITION ANNOUNCEMENTS

Senior Computer Application Engineer in Physics - Duties: Perform theoretical physics research using large scale, high-speed scientific computer, do algorithm design for parallel machines in the fields of particle physics, plasma physics, device and circuit simulations and fluid flows, publish and lecture about results of these matters to audiences including University and Government physicists. Requirements: Ph D degree in physics, two years experience as a theoretical physicist, education or experience must include two years use of super high-speed computers for computational physics research; must currently have international contacts and reputation among theoretical physicists—demonstrated by authorship of at least ten scientific articles in the area of physics (published within the last three years), participation as a speaker in at least five scientific conferences or symposia concerning physics within the last three years, and at least five letters of recommendation establishing the international reputation of the applicant. Terms: $43,620 per year. Send resume, no later than July 18, 1986, to Sue Hennig, Eau Claire Job Service, Call Box 2, Eau Claire, WI 52702, Job Order #1180735.

SYSTEMS ANALYST
## MARKETING SYSTEMS

Southeastern based Fortune 50 Company seeking individual with experience supporting marketing systems preferably in a consumer oriented environment. Desire degreed individual with outstanding interpersonal skills. Outstanding benefits and relocation assistance. Salary $35-42,000 range - D.O.E. Contact: Laree Shulman c/o

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## DATA PROCESSING INSTRUCTOR

Johnson County Community College in suburban Kansas City is accepting applications for Data Processing Instructor to teach COBOL I and COBOL II

Nine-month contractual position requires bachelors degree, three years of experience in Data Processing, and experience in industry with COBOL. Preference will be given to those having community college teaching experience. CICS and Database Management experience

Competitive salary and outstanding benefits. Application deadline July 3, 1986. To receive application, send resume or contact:

**Human Resources Office**
**JOHNSON COUNTY**
**COMMUNITY COLLEGE**

POSITION ANNOUNCEMENTS

POSITION ANNOUNCEMENTS

# COMPUTER SERVICES DEPARTMENT WAYNE COUNTY COMMUNITY COLLEGE

The Wayne County Community College has a modern data processing center in downtown Detroit which utilizes a dual Honeywell DP58/52 Computer System to service five campuses. A primary objective of the College is to maintain a state-of-the-art posture in data processing in order to provide a high level of service for Administrative and Academic activities. The current reorganization of the CSD staff represents a ground floor opportunity for candidates. Candidates should have, as a minimum, a Bachelor's degree in Computer Science or Business Administration. Experience with Honeywell and IBM is preferred along with an Education and/or Government background. Six (6) immediate openings exist

### ● TECHNICAL DIRECTOR

This second in command position which reports to the CSD Director, will direct the day-to-day management of the departmental activities. All three of the CSD sections will report directly to this position. This includes Application Systems, Computer Operations, and Technical Systems. Candidates should have a minimum of five (5) years experience in a large scale computer environment with at least three (3) years as a divisional or department manager. Salary will be commensurate with work experience

### ● SENIOR TECHNICAL SYSTEMS SPECIALIST

This lead technical position is responsible for the maintenance of operating systems, determining the reasons for production failures, and upgrading technical systems in general to attain maximum efficiency. A minimum of two (2) years axperience in maintaining GCOS 8 is required and GCOS 8 installation experience is preferred. An in-depth knowledge of GMAP and COBOL is required with a knowledge of FORTRAN and C-Language preferred. Salary $32,729 - $37,813

### ● APPLICATION PROJECT LEADER

Conducts technical and financial studies for the design and justification of major EDP systems and acts as project leader in the development, enhancement and/or maintenance of complex computer applications. Minimum of three (3) years experience as an application analyst/programmer in a large scale computer environment. Strong skills in COBOL and data base management systems required. Salary: $32,729 - $37,813

### ● PRODUCTION CONTROL SUPERVISOR

Under the direction of the Manager of Computer Operations, this position will develop, plan, and supervise execution of the computer master schedule. Additionally this position will supervise all data entry and production control activities. A minimum of three (3) years experience is required in a large scale computer production control environment. Salary $24,583 - $28,395

### ● PRODUCTION QUALITY ASSURANCE ANALYST

This position, which reports to the Manager of Computer Operations, is responsible for the successful implementation of production job changes for new applications, systems enhancements, and job modifications. Additionally, this position is responsible for all password integrity, analysis of operational problems, and adherence to program testing policies. This position requires a minimum of three (3) years in data processing related to quality control, production control, and/or programming. Salary: $27,635. - $31,447

### ● MICRO-COMPUTER SPECIALIST

This staff position reports to the CSD Director and will assure adherence to the micro-computer acquisition policy, acts as a consultant to User organizations in the selection/installation process, architects micro-computer networking, and assures hardware/software compatibility. A knowledge of MS-DOS and UNIX is required with a preference for C-Language as well. A minimum of two (2) years micro based application programming is required. Salary $27,635 - $31,447

Applications, resumes and inquiries must be sent no later than June 23, 1986 to:

**Wayne County Community College**
**Personnel Office**
**801 W. Fort Street**
**Detroit, MI 48226**

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## System 38 Senior Programmer Analyst

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**We offer an excellent salary, ultra-modern work environment, and an outstanding flexible benefits package. For confidential consideration, please send resume with salary history to Personnel. PRINCIPALS ONLY, PLEASE.**

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- **Programmer Analysts**
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## DATA PROCESSING OPERATIONS MGR
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Temporary assignment for a period of one year. Responsible for the management of technical personnel involved with the development and implementation of various management information system projects. Must have a college degree in Computer Science or Business with four years experience of increasing responsibility in programming, systems analysis, project management and preferably current experience with IBM software. Previous management experience is also highly desirable. Send resume to Employment, PO Box 2842, St. Petersburg, Florida 33731. Resumes will be received until June 27th, 1986
EOE

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SYSTEMS 38 P/A's, MGT
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Send resume to:

**Executive Data Search**

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Just a sample of the openings we have

**Sr. Systems Analyst - insurance bkgd., GA location, $30-35,000 range.**

**Programmer/Analyst - mfg. bkgd., Orlando, FL location, $30-35,000 range.**

**Systems Programmer - mfg. bkgd., Orlando, FL location, $40-45,000 range.**

**Programmer/Analyst - banking bkgd. IBM 3033 OS/MVS environment, SC location. $25,000 range.**

If you are interested in making a career change in the southeast (or the idea sounds exciting to you!), then give me a call collect at 904-398-7371 or send your resume in strict confidence. We have an excellent working relationship with the IBM shops within all industries in the southeast. We're the recruiting firm they turn to

**Susan E. Lankford**
**Data Processing Recruiter**

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## COMPUTER OPERATIONS SUPERVISOR - VAX

Will coordinate the installation of a large VAX-based office automation network in multiple locations and supervise ongoing computer operations. Opportunity to make a major contribution to the productivity of a large state agency. Will participate in system design and development of operations procedures.

Preferred candidate will have significant VAX/VMS, IBM PC, and system administration experience, plus strong organizational, administrative, technical, and analytical skills.

Send resume and salary requirements to: **Patricia Ryan Connolly, DOR, 100 Cambridge Street, Room 700, Boston, MA 02204.**

**Massachusetts Department of Revenue**

# OUTSTANDING OPPORTUNITIES WITH A LEADER IN FLORIDA

BARNETT COMPUTING COMPANY is the data processing subsidiary of Florida's largest bank holding company and has the following opportunities available:

## CIF SUPPORT

This position acts as liaison/troubleshooter between our banks and D.P. staff. Job responsibilities include research and development, implementation and support of Customer Information File applications. Thorough knowledge of Customer Information File (operational, scrub, linking, conversion, maintenance) is necessary. End-user experience (i.e. CIF Product Manager) and a background training others preferred. Some overnight travel is required.

## DATA BASE MANAGEMENT/ADMINISTRATION

We require 5 years experience in all phases of systems and programming 2 years of which include a background in Data Base design and functional performance with IMS. Responsibilities include developing the entire Data Base Administration program.

## TANDEM PROGRAMMER

1-2 years on the job experience in TAL/Tandem with previous background in developing TAL necessary. ACI Base 24 experience is highly preferred.

## VOICE/DATA TELECOMMUNICATIONS

**SYSTEMS DEVELOPMENT ANALYST:** requires 4 year technical degree and excellent analytical and communication skills are necessary. Candidates should possess 3 years experience in evaluating, designing and implementing various state-of-the-art voice/data systems, (microwave, fiber optics, satellite, TI, ISON, LAN, WAN, VAN, office automation, etc.). You will be responsible for the evaluation of advanced voice/data technology and management of pilot implementation.

**ANALYST/STAFF CONSULTANT:** Bachelors degree and a minimum of 4 years experience with various voice PBX systems (ATTIS, ROLM, GTE, NEC, Northern Telecom, etc.). Excellent analytical and communication skills necessary. Experience as an Account Executive with a major phone company would be ideal. Responsibilities include providing voice, analytical and consulting services to various Barnett subsidiaries.

We offer a highly competitive salary and benefits package, relocation assistance and an ideal location. For immediate consideration send your resume to: B. Talbert, Employment Officer, BARNETT COMPUTING COMPANY, P.O. Box 10068, Jacksonville, FL 32207. An equal opportunity employer m/f/v/h.

Barnett Bank

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# "We have it in our power to begin the world over again"

— Thomas Paine
American Political Philosopher and Author

You have it in your power to change your world—your career and your lifestyle by contacting TRW's Operations and Support Group in Southern California.

Forget the swaying palm trees, beautiful beaches and snow capped mountains. Although much of it's true, let's forget all the hype about Southern California. Let's talk about your career and opportunities at TRW.

You can be part of a team that is designing and developing the systems of the future if you're an IDMS professional with a Bachelor's degree and at least 2 years experience. Tomorrow is taking shape at a company called TRW.

- **IDMS ADS/O Programmer Analysts**
- **IDMS Data Base Administrator**
- **IDMS Software System Test Planner**
- **IDMS Senior Systems Analysts**
- **IDMS C-SPEC Project Leader**

TRW offers excellent salaries and benefits including medical/dental/vision care coverage, liberal stock savings program, flexible hours, and a fabulous Southern California lifestyle. Please forward your resume with salary history to: **TRW O&SG, R. Chambers, E1/4029, One Space Park, Redondo Beach, CA 90278, Attn: Dept. CW.**

Equal Opportunity Employer
**U.S. Citizenship Required**

TRW

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# GROUP HEALTH ASSOCIATION, INC. (GHA)

Expanding, well-established HMO in Washington, DC is seeking motivated professionals for the following positions:

- **ASSOCIATE DIRECTOR FOR MIS OPERATIONS** to take charge of computer operations, data communications, systems programming and data entry supervision. 5 years experience with Hewlett-Packard processors required.
- **FINANCIAL SYSTEMS ANALYST** responsible for analysis, design, implementation and project management for major financial systems. 3-5 years systems analysis experience required, preferably healthcare related.
- **TRAINING SPECIALIST, END-USER COMPUTING** to support ad hoc query, electronic mail, graphics, and personal computer software. Excellent interpersonal skills along with proven training skills are essential.

Positions located in state-of-the-art MIS Department utilizing 3 HP/3000-68 processors and over 500 terminals. Competitive compensation and excellent work environment.

**Contact:** **Fred Heavy, Director of MIS**
**c/o Dept. of Human Resources**
**Group Health Association**
**4301 Connecticut Ave., N.W.**
**Washington, DC 20008**
**EOE M/F/H**

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# Aerojet Strategic Propulsion Company

With a remarkable history of innovation in the solid propulsion field, Aerojet Strategic Propulsion Company has played an integral role in our nation's defense and space exploration programs. An opportunity now exists within our advanced Computer Group for a professional qualified to join us as

## Data Base Administrator

You will perform data analysis and modeling, plus data base design, training and end user support. Involves designing and implementing data base on VAX Cluster, as well as analyzing end user data requirements in conjunction with application developers.

Requires BS in CS or a related field and 3-5 years programmer analyst experience, including a background in data base design. Experience with data base organizational techniques, performance monitoring/timing, and system security is essential. Knowledge of Fortran, VAX and Oracle is highly desired.

As one of the Aerojet General companies, we offer competitive compensation and benefits, plus a great location with affordable housing, a moderate climate, and close proximity to San Francisco and Lake Tahoe. For consideration, send your resume with salary requirements to: **Aerojet Strategic Propulsion Company, Professional Employment, Dept. GF-CW, P.O. Box 13618, Sacramento, CA 95853-4502.**

An Equal Opportunity/Affirmative Action Employer
U.S. Citizenship Required

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## DATA PROCESSING EXPANSION POSITIONS

Continued growth of Southeastern banks has created numerous positions for a variety of data processing professionals with the following skills:

| | |
|---|---|
| P/A w/ check processing exp | up to $34K |
| P/A w/ HOGAN experience | up to $40K |
| S/P w/ CICS, MVS | up to $50K |
| P/A w/ Home Mortgage exp | salary open |
| P/A w/ general banking apps | salary open |

These positions offer excellent growth opportunities in progressive IBM, MVS, environments. Client company assumes all interview, relocation and associated fees. Contact Laree Shulman c/o

**DATAMASTERS**
P.O. Box 6888
Greensboro, NC 27415
(919) 373-1461

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Systems Analyst, EDP: Technical maintenance of letter of credit, foreign exchange and arbitrage computer systems operational on IBM systems 34, 36 and 38 including preventive as well as operational maintenance utilization of COBOL and RPG. BSc in Computer Science or Data Processing required plus 3 years experience or 3 years in system analysis/programming. $43,000 per year, 35 hours per week. Apply NYS Job Service, JO #NY8025752, 175 Remsen St., 2nd Floor, Brooklyn, NY 11201.

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## SOUTHEAST

Our 25th year of serving North Carolina and the Southeast in the Data Processing field. Client Fortune Companies need Programmers, Analysts, Systems Programmers, etc. for permanent and contract positions. Let us confidentially and professionally help you meet these career goals. Any hardware/software ok. Fee paid. Write or call today.

**DABBS & DABBS**

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# Just A Reminder!

## PC Expo
## July 9th - 11th

Computerworld will be providing Bonus Distribution at PC Expo being held in New York, NY in the July 7th edition. The closing for this issue is June 27th. Please get your advertising materials or space reservations in early!

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

## Programmer/Analysts
### Phoenix, Arizona

Recent growth and expansion of Corporation has resulted in new positions being added to our Application Systems Division. The expansion is creating new opportunities to participate in online application development.

Experienced Programmer/Analysts needed in three of the Division's applications groups (Financial, Clinical and Patient Management). Qualified applicants must have a minimum of 2 years IBM experience and knowledge of OS/MVS, COBOL, and CICS, with a Bachelor's degree in Computer Science or related field.

Excellent benefits and advancement opportunities in Arizona's largest healthcare system. Submit resume including salary history to: Samaritan Health Service, Personnel Dept., 215 E. McDowell Rd., Phoenix, AZ 85004. An Equal Opportunity Employer M/F/H/V.

**Samaritan Health Service**

## WEST COAST ANALYSTS/PROGRAMMERS

The West Coast's fastest growing computer consulting firm, IG Systems, has openings for experienced analysts and programmers. Full time employee and consultant positions available for sharp, energetic professionals with 2 years plus experience and looking for a challenge.

Full benefits, training and bonus programs offered. Opportunities exist in Los Angeles, San Francisco, Seattle, Austin, Dallas and other project locations in the Western United States.

Send resume to:

**IG Systems**
**1301 Shoreway Rd.**
**Suite 200**
**Belmont, CA 94002**

## Data Systems Technical Support Manager

**$45,192 - $58,056 Annually**
**(1986-87 Salary Schedule)**
**Excellent Benefit Package**

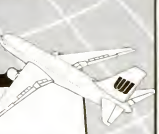
San Diego City Schools has a management vacancy to provide technical staff support for the professional and operations personnel of the Data Systems Department. Must possess training and experience equal to Bachelor's degree in Info Systems or Business/Public Administration with supplemental courses in Systems and programming and experience with IBM 4381, VM/XA, MVS/SP Operating systems, with 8 years progressively responsible system development experience and at least 3 years supervisory experience.

Requires special application which must be filed by Monday, June 30, 1986. Obtain information and application from San Diego City Schools, 4100 Normal St., San Diego, CA 92103, or call (619) 293-8150.

*An Equal Opportunity Employer*

# The World Is Looking Up To Us

### Chicago and Denver openings



We would like to prove to you that United is unmatched in its commitment to state-of-the-art technology What we can show you is opportunity at all levels in all areas It's opportunity that comes from growth and means growth for you

## TECHNICAL SUPPORT

Let your expertise bring you into an environment of current — and future — state-of-the-art technologies And let your ambition make you a part of the technical leadership for the largest computer system and communications network in the airline industry.

- SNA • MVS/XA • VM/CMS • UNIX • MS/DOS • OS/1100
- CMS 1100 • TELCON • CICS • IDMS/R

- Systems Programmers • Capacity & Performance Analysts/Planners
- Hardware/Software Engineers (PC Based Microprocessors)
- LAN Design and Configuration Planners
- Strategic Technical Planners

## APPLICATIONS DEVELOPMENT

Join the challenge of providing critical systems support for Finance, Marketing, Human Resources and Flight Operations in our fast-paced environment Analyze, design and develop sophisticated, highly integrated IBM applications or work in our Sperry UNIVAC Systems.

- COBOL • MVS/XA • CICS(Command or Macro) • IDMS/R
- Sperry UNIVAC • OS 1100/93-39R3-TIP, FORTRAN
- MS/DOS • UNIX • C • MICROPROCESSORS

- Systems Analysts • Sr. Systems Analysts • Sr. Data Base Analysts
- Team Leaders • Applications Development Managers

## COMMUNICATIONS

With United's 60,000 plus terminals and large integrated system — the largest in the world — this vital resource remains abreast of the constant changes in global communications Where else can you explore every emerging technology? You will here

- SNA • Network Capacity & Performance (Traffic modeling – planning)
- Transmission Planning (satellite, voice, fiber, PABX)
- International Networking • Voice/Data Integration
- Systems Programming

## ACP/TPF

Be at the heart of computer applications development for APOLLO, United's extraordinary reservations system. This industry-leading source provides over 6,000 travel agents — and every United customer — with immediate access to the vital information that starts them flying

- Applications Development Programmers • Console Operators
- System Internals • Applications Development Managers
- Communications Network (SNA, NCCF, NPDA, SDLC)

## THERE'S MORE!

Space doesn't allow us to print all of our openings in the many growth areas of our MIS Division If you are interested in learning more, please do not hesitate to write to us this week

We offer opportunities in one of the nation's most desirable places to live We can show you what this means to you to your family And we can offer you a compensation package that will rival any We also provide pass/reduced fare air travel privileges Find out more Send resume to **Professional Employment, United Airlines, EXOPX-TM6CW, P.O. Box 66100, Chicago, Il. 60666.** *Equal Opportunity Employer* **PRINCIPALS ONLY PLEASE!**

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## S/38

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| Prog | $23K | MAPICS | $40K |
| Prog | $26.5K | PCR | $35K |
| P/A | $26K | DPM | $42K |
| P/A | $32K | MIS | $50K |
| S/A | $38K | MIS | $65K |

Resource Placement Group III

Contact Paul Martin
1-800-253-2256
Ask for Ext. RPG3

Division of City & Nat'l Employment Inc.
P.O. Box 83
Waterloo, IA 50704

## S/38 PROGRAMMER ANALYST VERMONT

The Rutland Public Schools seeks a highly motivated, take charge individual for its Data Processing Department. Responsible for entire data processing environment. The interested candidates should have a strong programming background, with at least 2 years of S/38 RPG III experience. Competitive salary and benefits.

Apply to:

**Superintendent of Schools**
**Rutland Public Schools**
**8 Church Street**
**Rutland, VT 05701**

## FLORIDA CONTRACT OPPORTUNITIES

- DB 2
- IDMS, ADS/O
- IMS- DB/DC
- CICS, COBOL
- Intel 8086/88, ICE
- TANDEM, COBOL
- UNIX, "C"
- MSA Software
- Life/70
- GMS ins. software
- Cybertek software
- VANTAGE FPRA
- Logic Credit Life

We have immediate assignments for professionals with significant experience in any of the above

COMPUTERPEOPLE

**12225 28th Street North**
**St. Petersburg, FL 33702**
**(813) 578-2878**
**or**
**2005 W. Cypress Creek Rd.,**

## Scientific Programmers

Fermi National Accelerator Laboratory, the world's largest high energy physics research facility, has immediate opportunities for experienced programmers in our challenging VAX environment.

If you have 3 or more years experience in data acquisition and diagnostics, applications software for real time controls systems, DEC software product installation and maintenance using VAX/VMS, VMS/RX11M, MICROVAX and PDP-11 machines, we would like to hear from you. Additionally, you must have experience in FORTRAN, FORTRAN 77, ASSEMBLER and PASCAL. Bachelor's degree in Physics, Computer Science or related field required.

Become a part of this prestigious international research community by forwarding your resume, complete with salary history, to: **James Lasenby, Fermi National Accelerator Laboratory, P.O. Box 500, Batavia, Illinois 60510.** An Equal Opportunity Employer M/F.

**Fermilab**

## CONTRACT PROGRAMMERS

'Who's Who In Contract Programming', a national directory of Independent Contract Programmers is now being prepared. For details regarding benefits and inclusion in this elite publication send

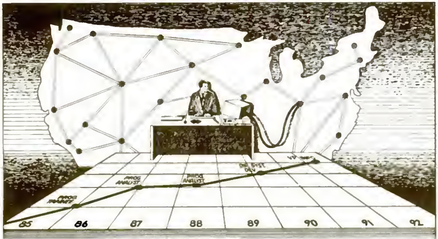
## EDP OPPORTUNITIES

If you have 2 yrs + exp. on the following equipment, then we want to talk to you.

- IBM Mainframe
- HP3000
- Burroughs Mainframe
- IBM System 38

We specialize in Data Processing placements in the Southeast. If you are interested in pursuing CAREER opportunities then send us your resume or call TODAY!

VIP Personnel Services



# The networking concept applied to your career.

CompuSearch gives you the network you need to make opportunities happen in data processing. CompuSearch opens the gate to possibilities in data processing across the country. And when you expand your possibilities, you increase your opportunities for success. It's as simple as that.

Our Account Executives are in touch with the changes taking place in the data processing field. CompuSearch gives you a network of contacts to every level of the data processing industry.

Get in touch with the CompuSearch network. CompuSearch can expand your ability to make contact with the data processing world.

**CompuSearch®**
A DIVISION OF MANAGEMENT RECRUITERS

**We find the challenge. And the challengers.**

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# THE SYSTEMS CHALLENGE...

*It has taken an ongoing commitment to technology to support Humana's integrated healthcare system. The demand for the systems to efficiently control our operations is tremendous. We're in the forefront of healthcare today because we consistently incorporate the very latest, most versatile technology...*

## FOR A WORLDWIDE HEALTHCARE NETWORK

*IBM 3090/3084, operating under MVS/XA and a Database Management System comprising IDMS/R release 10.0 reflect our technology-driven environment. Plus we're currently developing systems to support our health insurance division which has grown from zero to 650,000 members in the past two years.*

## PROGRAMMERS • SYSTEMS ANALYSTS • PROJECT LEADERS

*Our need is for individuals with experience ranging from 3 yrs. and up. Our opportunities for advancement are almost limitless, as the best in software talent move into both management and technical fields.*

*Our assurance is that you will find challenge and growth in a corporation committed to technology. Now is the time to find out more about your future with Humana. Please send your resume with salary history to:* ***Eugene Ford, Jr., Humana Inc., The Humana Building, 500 West Main, Louisville, KY 40201-1438 or call COLLECT 502/580-3414.*** *EOE/M/F.*

**Humana**

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# Computer Professionals

Intelogic Trace, Inc., is the largest independent Computer Telecommunications support/service company. We are embarking on a major in-house systems project and have an immediate need for full-time permanent employees in the following categories for major software implementation and continued support.

## Applications Programmers

We need 7 Applications Programmers to work in an IBM 3083 MVS/XA operating environment. At least 2 years experience in CICS and COBOL is mandatory with at least 12 months IDMS. Will implement and support software packages for accounts receivable, accounts payable, fixed assets, purchasing, and inventory control. Experience in any of the following will be a plus: CULPRIT, OLQ, ROSCOE, DYL280.

## Systems/Communications Programmers

We need one Systems Programmer to provide maintenance and support of the above mainframe operating environment. This position requires 2 plus years IBM MVS systems programming experience. Another person is needed to help maintain a large communications environment encompassing all of the above with CODEX equipment. One plus years of communication related experience (e.g., VTAM, NCP) required.

## Computer Operators

We need 3 additional Computer Operators. Applicants must have at least 2 years experience in an IBM MVS/XA operating environment and be technically oriented. Supervisory and leadership skills are a plus in this area.

## Communications Network Controller

This position requires 2 years experience in Networking Data Communications preferably with CODEX equipment. Significant experience in a customer/user service relations environment desired. Will help develop, configure, and maintain the equipment used for data communications and local area networking.

If you have the qualities we're looking for, come to Intelogic Trace, Inc., and become part of a dynamic network of professional problem solvers. For immediate consideration, stop by and fill out an application or send your resume to: **Intelogic Trace, Inc., P.O. Box 400044, 8415 Datapoint Drive, San Antonio, TX 78229-8410.**

An Equal Opportunity Employer

**INTELOGIC TRACE, INC.**

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## C LANGUAGE PROGRAMMER

Fast growing firm seeks experienced and creative C language programmer. You will work on high level application software for PC based local area networks. Experience with DBMS systems, MS-DOS, and network operating systems highly valued. Send resume and salary history in complete confidence to:

LAN

**LAN Systems, Inc.**
**599 Broadway, 11th Floor**
**New York, N.Y. 10012**

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## SENIOR RESEARCH PROGRAMMER

Manage an established Harris H800 system that provides services to research-oriented academic department with 200 faculty/staff. Develop/maintain software for scientific DP, text processing, DB management, and networking. BS/BA and at least 2 years experience with a major operating system. Rank open, $30-$35,000. Position available immediately. Contact: Dr. Emanuel Donchin, Head, Department of Psychology, University of Illinois, 603 E. Daniel, Champaign, IL 61820 (217) 333-0632. In order to ensure full consideration, application must be received by July 14, 1986. The University of Illinois is an affirmative action/equal opportunity employer.

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## WANG VS PROGRAMMER

Established S/W house needs Programmer/Analyst with 3+ years experience with business applications. Must know Wang VS and COBOL. MCBA and management experience a plus. Challenging work, excellent environment.

**MCBA**
**425 West Broadway**
**Glendale, CA 91204**
**(818) 242-9600**

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## SYSTEMS PROGRAMMER - IBM

The Academic Computer Center at Western Michigan University seeks a Systems Programmer who has 2 years experience with VM/CMS to install and maintain the operating system and utilities on an IBM 4341. Additional responsibilities include systems management and performance measurements, technical consulting and vendor liaison. Strong communication skills, formal education in computer science or related field, familiarity with data communications are required. Qualified candidates should send their resumes to Ms. Victoria Blackman, Manager of Employ-

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# North Carolina Is GROWING! Be Part Of It.

**Systems to low $40's**

Ground-floor opportunity in new data center start-up (600+ staff). Dual IBM 3090s MVS XA database shop is currently searching for specialists in:

- MVS
- NCP/VTAM
- CICS
- IMS or IDMS

Must be capable of rapid advancement into [illegible]

**Applications to $40,000+**

Worldwide manufacturing company has just recently approved several key positions due to expansion. Opportunities exist for PA's and SA's in a large multi-CPU environment. Candidates must possess any two of the following: **COBOL, IMS, CICS, or IDMS**. If you are serious about a career move, call Robert Montgomery collect at (919) 872-2940 or send

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# CAROLINAS TO FLORIDA

**Over 800 Client Companies (2 yrs. min. exp.)**
**— ALL FEES PAID —**
**SALARIES $23,445 to $46,700 (2 yrs. min. IBM exp.)**

- **SYSTEMS PROGRAMMER** (CICS, NCP/VTAM or MVS)
- **PROGRAMMER/ANALYSTS** (COBOL, RPG, CICS, IMS or DB/DC)
- **DATABASE-P/A's, DBA's** (IDMS, IMS, ADABAS/NATURAL, ADR/DATACOM)
- **PROJECT LEADERS** (Immediate need for mfg. or finance)

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Charlotte, NC 28211

Call Collect 704-366-1047
Contact Ron Doerfler

SALARIES $20,000+ TO $75,000+

— COMPUTER PROFESSIONALS —

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We make your ads work harder. Because we divide the classified section into logical categories: Micro Direct Shopper; Position Announcements; Buy, Sell, Swap; Software For Sale; Time & Services; and The Bulletin Board. (Others available on request.) So the people you want to reach will spend less time looking for your ad, and more time reading it.

We'll even typeset your ad at no extra charge. All you need to do is attach clean typewritten copy to your order. (Figure about 25 words per column inch, not including headlines). Or give us your order over the phone. We'll do the rest.

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**COMPUTERWORLD**

# MIS OPPORTUNITIES AT MCI SOUTHEAST "SUNBELT HEADQUARTERS."

**A start-up, profit-oriented operation where you can make a difference, and enjoy the rewards.**

The growth of the Southeast Division of MCI continues to forge ahead at the forefront of MCI Telecommunications Corporation, the nation's leader in telecommunications.

Our "Sunbelt Headquarters" in Atlanta is the nerve center for extensive and dynamically expanding DP operations throughout our nine-state region. Today's ground floor opportunities will allow you to reap the professional rewards of all this growth.

**What kind of person thrives in the MCI "culture?"**

You're an enthusiastic team player but relish the opportunity to be 100% responsible for a task/project as well. You may not be "on the market," but sense the fast-track, long-term career potential for an ambitious, technical contributor at the industry's maverick and independent front runner. You recognize that being part of a start-up nucleus isn't all plush, polish, and instant gratification. But you know that hard work pays off.

**Business Applications Programmer/Analysts**

These positions will be assigned to the Business Systems Group to design, code and test applications for our IBM mainframe. Responsibilities will include:

- Coding programs
- Planning, designing and performing systems test
- Performing program maintenance
- Developing program specifications

Mandatory prerequisites include:

- 2-4 years' programming experience
- COBOL
- VSAM
- IBM environment (MVS/XA)
- Complex JCL procedures
- Detail program design
- Structured methodology
- Should be intelligent, articulate, flexible, a team player.

If you can combine the above skills with the initiative and insights of a fast-learner, a self-starter/team player attitude, and a commitment to quality, **call MARC WHITEHEAD (404) 668-6315.**

Or, submit résumé with salary history to him at:
**Human Resources, Dept. 284MIS,**
**MCI Telecommunications Corp.,**
**400 Perimeter Center Terrace, NE,**
**Suite 400, Atlanta, GA 30346.**
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MCI

# NATURAL-ADABAS

## PROGRAMMERS AND ANALYSTS

SPL is the world's leading developer of custom application systems using Natural/Adabas.

We are a group consisting of, and run by, people who want to do only the highest quality work in a stimulating, politics-free environment.

In the USA, we provide consulting services to Natural/Adabas users and teach SAGNA's 4th Generation System Design class.

Internationally, we also sell and support the SAG products out of our offices in Australia, Hong Kong, Israel, New Zealand, Singapore and South Africa.

We need people for our new offices in CHICAGO and LOS ANGELES and for our SAN FRANCISCO head office.

If you are an enthusiastic Natural programmer (and very good, of course), or an experienced 4G system designer, who wants to build high-quality, successful systems, call or write now.

SPL

systems programming limited

# COLLEGE OF ENGINEERING AND PETROLEUM DEPARTMENT OF ELECTRICAL & COMPUTER ENGINEERING KUWAIT UNIVERSITY

## STATE OF KUWAIT

Applicants are invited to apply to the Department of Electrical & Computer Engineering for the academic year commencing September 1, 1987. Specialities required are:

- Computer Engineering/Computer Science
- Electronic Circuits
- Communications
- Control

Initial contracts may be entered for a maximum of three years and are renewable upon mutual agreement of both parties.

English is the language of instruction and teaching is based on the semester credit system.

The College of Engineering at Kuwait University as of academic year 1985-1986, consists of four departments: Mechanical, Electrical and Computer, Civil and Chemical Engineering. About 1500 students are enrolled in the undergraduate program and 98 in the Master's Program that started in September 1985. The College consists of eighty five (85) active faculty members. Research facilities are available in terms of Library Services, Computing Services and well equipped laboratories. Funds are made available through the Research Management Unit at Kuwait University, Government and Private sectors. Frequently, the College offers short intensive courses to industrial and governmental personnel.

Application forms and conditions of service may be obtained from:

Kuwait University Office
Embassy of the State of Kuwait
3500 International Dr. N.W.
Washington, D.C. 20008

Completed applications, together with representative publications and non-returnable copies of academic qualifications must be returned to:

Recruitment Office
College of Engineering & Petroleum
Kuwait University
P.O. Box 5969
KUWAIT

**by August 31, 1986**

Appointments are governed by the following considerations:

1) Rank and salary will be determined according to present academic position, qualifications and years of experience. There is no income tax in Kuwait.
2) Annual return air tickets to the country of citizenship or permanent residence are provided for spouse and three children not exceeding the age of twenty.
3) Free furnished accommodation with free utilities supplied.
4) Education allowance for school-age children.
5) Minimum of two months annual paid-vacation.
6) End of service gratuity equal to one month's basic salary for each year of service.
7) Free health care.
8) Standard of living is comparable to those in USA and Western Europe. There is no income tax in Kuwait.

VERMONT RURAL NORTHERN NEW ENGLAND

- PROGRAMMERS
- PROGRAMMER/ANALYSTS
- SYSTEMS ANALYSTS
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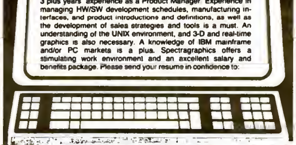

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*Computerworld* can be purchased on 35 mm microform through University Microfilm Int., Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106.
Phone: (313) 761-4700. *Computerworld* is indexed: write to Circulation Dept. for subscription information.

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INDUSTRY NOTES

# DG lays off 400 in two plants

**Data General Corp.** announced the closing and proposed sale of peripheral assembly plants in Austin, Texas, and Hong Kong, resulting in the layoff of 200 workers in each location. About 50 employees from each plant will be transferred within the company, and DG will record a charge of about $6 million from the action in the current quarter.

DG also announced the formation of a Volume Products Division to include its laptop and desktop computers. The Westboro, Mass.-based mini vendor also consolidated its MIS and DP organization but did not eliminate any jobs in the move.

■

**Control Data Corp.**'s lead banks last week agreed to the company's plan to repay $375 million in short-term debts on which it had been in default since last fall. CDC paid $26 million and agreed to pay the balance before the end of 1986, pledging the stock of its Arbitron and Commercial Credit Co. units as collateral. CDC last week also issued $350 million worth of public bond offerings to raise cash.

■

**Digital Equipment Corp.** agreed to pay $9 million in an out-of-court settlement of shareholders' suits filed in 1983. The class-action suits charged that DEC failed to warn stockholders of a 65% earnings decline in its first quarter ended Oct. 1, 1983.

**Burroughs Corp.** said it will purchase 53% of the 58 million **Sperry Corp.** shares tendered by the June 10 deadline for the agreed price of $76.50 per share, or a total of $2.37 billion.

Sperry named eight new directors designated by Burroughs, including Chairman W. Michael Blumenthal, while four Sperry directors, none of them Sperry executives, resigned.

■

**Ashton-Tate** reorganized into two units. The software products division, under marketing and strategic planning head Roy E. Folk, will include marketing, R&D and documentation. The systems, service and information division, under sales and international head Ronald S. Posner, will include customer support and micro-mainframe links.

■

**AST Research, Inc.**, reorganized its IBM-related business along market rather than product lines. AST will consist of a personal workstation enhancements unit, a communications unit and an advanced technology group for products such as laser printers and disk subsystems.

■

Lagging behind Symbolics, Inc. in the artificial intelligence workstation field, **Lisp Machines, Inc.** of Andover, Mass., laid off 60 employees, or 25% of its work force.

# Order increase may light fire

**ACTIVE ISSUES**
Kathy Porteus

By many accounts, the technology sector of the stock market will explode with activity when sparked by definite signs of improving domestic orders. "If a couple of computer companies say business has really changed," says Rick Martin, research analyst with Sanford C. Bernstein & Co., "then investors will be willing to bet on the upturn, and money will come pouring back in to technology stocks."

Because computer companies such as IBM are tight-lipped about business conditions, analysts and investors can only guess when such information will be released. Some speculate that IBM will offer an indication of its order rate during a meeting with analysts this week in San Jose, Calif.

"I think investors will take the slightest bit of good news from IBM as being very positive," Martin says. Martin currently recommends purchase of IBM because the stock is "unbelievably cheap."

While waiting for an appreciable turn in capital spending, which may still be months away, technology stocks have generally underperformed the Standard & Poor's Corp. index of 400 stocks. According to the L. F. Rothschild, Unterberg Towbin Technology Index, the S&P 400 has improved 15.2% since the beginning of 1986, whereas L. F. Rothschild's unweighted index of 166 technology stocks showed a 7.6% increase.

The key to playing this type of market successfully, analysts say, is stock selection. Although most technology issues have shown anywhere from a slight decline to moderate improvement, a few firms have racked up substantial price-per-share gains. One of the only technology stocks to have performed well in the past year is Cray Research, Inc. (CYR — 90⅜), which benefits from earnings visibility and its apparent immunity from difficult industry conditions.

Barry Bosak, analyst with Eberstadt Fleming & Co., says small capitalization stocks have tended to perform better than the bigger "cap" companies, of which only "a very select few have done well."

This trend is reflected in the stocks that have jumped more than 50% during this quarter: Apple Computer, Inc. (AAPL — 36), Seagate Technology Corp. (SGAT — 11⅞), Tandon Corp. (TCOR — 6⅜), Computer & Communications Technology Corp.(CCTC — 11⅞), Ashton-Tate (TATE — 32½) and Hogan Systems, Inc. (HOGN — 10⅞). Bosak says he expects stock selectivity to continue, doubting there "will be an overall trend like that in 1982," the year that all areas of technology went wild.

Stephen E. Yoken, L. F. Rothschild's director of technology research and designer of the firm's index, says he expects lackluster performance in technology stocks for the next few months. "The July-August period tends to be the slowest time of year for the computer industry and is always slowest for semiconductor companies," Yoken says. He does not anticipate that dramatic news will stimulate technology stocks as a whole.

According to Yoken, technology stocks will perform better toward the end of summer in anticipation of improved business conditions and favorable seasonal influences. Meanwhile, there is not much downside risk in such stocks unless a major market correction occurs.

Yoken expects companies such as Cray, Computer Sciences Corp. (CSC — 36⅞), Digital Equipment Corp. (DEC — 84⅛) and Ashton-Tate to continue doing well during this time.

While no one is comfortable predicting when companies will begin reporting sustainable business improvements, everyone is eager for the news to break. As Sanford's Martin explains, investors know that when capital spending accelerates, technology stocks outperform the market.

*Porteus is president of Strand Research Associates, a Centerville, Mass.-based company that provides customized research services for financial and high-tech firms.*

# Private-label PCs to hit mart

From page 174

exposed to the risks," Compaq's Swavely added. But he said the Computerland product is geared toward competing with lower-cost machines from vendors such as Leading Edge Products, Inc. and AT&T.

Computerland was expected to announce today a private-label modular computer system that can be configured as an IBM Personal Computer XT or AT compatible. The machine is manufactured by Trigem, Inc. of South Korea.

Some major corporations indicate they will stick with systems from IBM and Compaq because of fears of incompatibility. "We have stuck very much with the major brands," said a major financial firm's microsystems consultant, who asked not to be identified.

Others, such as Pacific Gas & Electric Co. (PG&E) of San Francisco, already purchase a variety of compatible machines and consider price and functionality to be the key concerns. "We are very concerned about price," said Thomas J. Buckholtz, office technology project coordinator for PG&E. "We look at cost, ease of maintenance and whether it will run all the software that we want it to."

The basic Computerland configuration, dubbed the BC88, includes the chassis, keyboard and power source for a suggested price of $1,495. With disk drives and a monitor, the Computerland machine is not particularly cheap, analysts said. A similarly configured AT-compatible, the BC286, will sell for $2,895.

# Judge OKs new MDS directors

From page 174

come of a June 23 show-cause hearing. But Tutino downplayed the potential effect of that hearing and said the board is proceeding with business.

"Normally a show-cause hearing

Last week's court action resulted from a bitter management dispute two weeks ago over who should head the operations of MDS Qantel, the company's sole operating unit [CW, June 9].

"It's still up to the judge," Christo said. "We sought both a temporary restraining order and an order to show cause, and we got one of them." Tutino said that the new board will consider major strategic changes even before naming a new president

# Harris combines network services, satellite communications divisions

**By James A. Martin**

MELBOURNE, Fla. — Harris Corp. said last week it combined its satellite communications and network services divisions in order to provide "total integrated communication networks to business users."

The two divisions will be combined immediately to form the Business Communication Systems Division under Harris' communications sector. The new division will market

pho-Net packet-switched networks.

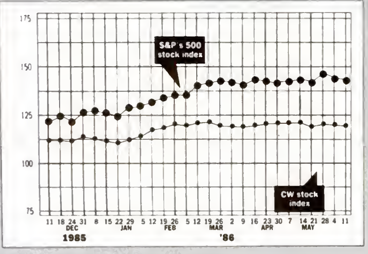
No products offered by the two divisions will be discontinued, a spokesman said, and the company does not plan to eliminate any jobs in the two divisions. Last fall, Harris fired roughly 100 administrative workers when it merged the analog and digital product divisions in its semiconductor sector [CW, Dec. 23].

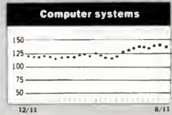
"The business communications market represents a tremendous op-

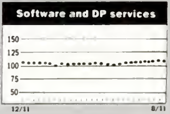
## COMPUTER INDUSTRY

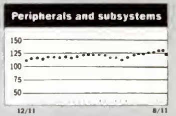
MITCHELL J. HAYES

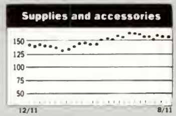
# Computerworld stock trading index

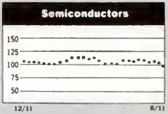


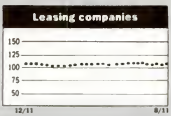












*All indexes reflect a historical base of 100 on Dec. 31, 1984, and trace stock market performance in relation to that base. The CW stock index represents the unweighted average performance of the six categories of computer industry stocks.*

| | 6/4/86 | 6/11/86 |
|---|---|---|
| Computer systems | 130.9 | **128.0** |
| Software and DP services | 106.7 | **106.3** |
| Peripherals and subsystems | 126.4 | **124.1** |
| Supplies and accessories | 154.9 | **154.4** |
| Semiconductors | 103.2 | **99.8** |
| Leasing companies | 103.8 | **104.0** |
| CW stock index | 120.6 | **119.0** |
| Standard and Poor's 500 stock index | 145.9 | **144.2** |

# Computerworld stock trading summary

CLOSING PRICES WEDNESDAY, JUNE 11, 1986

### COMPUTER SYSTEMS

| EXCH | | PRICE: 52-WEEK RANGE (1) | CLOSE JUN 11 1986 | WEEK NET CHNGE | WEEK PCT CHNGE |
|---|---|---|---|---|---|
| O | ALPHA MICROSYSTEMS | 5- 9 | 6 1/4 | -1/4 | -3.6 |
| O | ALTOS COMPUTER SYST | 9- 19 | 15 7/8 | -1/4 | -1.5 |
| A | AMDAHL CORP | 10- 18 | 18 1/8 | +1 | +5.8 |
| O | APOLLO COMPUTER | 9- 31 | 13 3/4 | -3/4 | -5.1 |
| O | APPLE COMPUTER INC | 14- 39 | 36 1/8 | -2 5/8 | -6.7 |
| N | AT&T | 19- 28 | 24 3/8 | -1/8 | -0.5 |
| N | BURROUGHS CORP | 52- 71 | 59 1/4 | +7/8 | +1.4 |
| O | COMPAQ COMPUTER CP | 5- 16 | 15 1/2 | -1 | -6.0 |
| O | COMPUTER AUTOMATION | 1- 9 | 3 1/8 | -1/8 | -3.8 |
| A | COMPUTER CONSOLES | 5- 14 | 11 | -1/8 | -1.1 |
| N | CONTROL DATA CORP | 15- 39 | 23 1/2 | -2 | -7.8 |
| O | CONVERGENT TECHNOL | 5- 13 | 7 3/4 | -3/4 | -8.8 |
| O | CPT CORP | 4- 8 | 4 3/8 | -1/8 | -2.7 |
| N | CRAY RESEARCH INC | 25- 94 | 91 1/2 | -2 | -2.1 |
| O | DAISY SYSTEMS CORP | 11- 38 | 12 | 0 | 0.0 |
| N | DATA GENERAL CORP | 31- 76 | 39 | -1 1/8 | -2.8 |
| N | DATAPOINT CORP | 5- 22 | 8 1/4 | -1/4 | -2.9 |
| N | DIGITAL EQUIPMENT | 42- 91 | 87 1/4 | -2 1/2 | -2.7 |
| A | EECO INC | 13- 20 | 20 | +3/8 | +1.9 |
| N | ELECTRONIC ASSOC. | 3- 7 | 5 1/2 | -1/8 | -2.2 |
| N | FLOATING POINT SYST | 18- 42 | 36 7/8 | -1/2 | -1.3 |
| N | FOXBORO | 22- 31 | 30 3/8 | -1/8 | -0.4 |
| N | GOULD INC | 20- 36 | 22 3/4 | -1/4 | -1.0 |
| N | HARRIS CORP | 22- 35 | 31 5/8 | +1/8 | +0.3 |
| N | HEWLETT-PACKARD CO | 29- 46 | 42 3/4 | -1 1/8 | -2.5 |
| N | HONEYWELL INC | 54- 87 | 80 | +1 7/8 | +2.3 |
| N | IBM | 117- 158 | 149 1/8 | -7/8 | -0.5 |
| O | IPL SYSTEMS INC | 1- 4 | 3 | 0 | 0.0 |
| N | ITT CORP | 28- 48 | 45 1/8 | -1 5/8 | -3.4 |
| N | M/A-COM INC | 13- 24 | 17 3/8 | +1 3/8 | +8.5 |
| N | MANAGEMENT ASSIST | 2- 28 | 2 1/2 | 0 | 0.0 |
| N | MATSUSHITA ELEC(ADR) | 49- 98 | 89 3/4 | +1 3/8 | +1.5 |
| O | MENTOR GRAPHICS | 13- 30 | 17 1/4 | -5/8 | -3.4 |
| N | MODULAR COMPUTER SYS | 8- 9 | 6 7/8 | 0 | 0.0 |
| N | MOHAWK DATA SCI | 1- 13 | 3 | -1/8 | -4.0 |
| N | NBI INC | 11- 20 | 11 1/4 | -1/4 | -2.1 |
| N | NCR | 25- 56 | 53 1/8 | -2 7/8 | -5.1 |
| N | PERKIN-ELMER | 22- 36 | 30 1/8 | +7/8 | +2.9 |
| N | PRIME COMPUTER INC | 15- 27 | 19 1/2 | -1/4 | -1.2 |
| N | SPERRY CORP | 39- 75 | 74 1/2 | -1/4 | -0.3 |
| O | STRATUS COMPUTER INC | 9- 25 | 20 3/4 | -2 3/4 | -11.7 |
| O | TANDEM COMPUTERS INC | 13- 34 | 32 3/4 | -3/4 | -2.2 |
| N | TANDY CORP | 24- 44 | 40 1/2 | -1 | -2.4 |
| O | TELEVIDEO SYSTEMS | 2- 4 | 3 | -1/4 | -7.6 |
| O | TELXON CORP | 8- 23 | 23 | 0 | 0.0 |
| N | TEXAS INSTRUMENTS | 86- 141 | 129 1/2 | -6 | -4.4 |
| A | ULTIMATE CORP | 8- 34 | 30 3/4 | -1 1/8 | -3.5 |
| O | VECTOR GRAPHICS INC | 1- 1 | 1/8 | 0 | 0.0 |
| A | WANG LABS "B" | 15- 29 | 16 1/4 | -7/8 | -5.1 |
| A | WANG LABS "C" | 15- 29 | 15 7/8 | -1 3/8 | -7.9 |
| N | XEROX CORP | 37- 72 | 57 1/4 | -1 3/8 | -2.3 |

### SUPPLIES & ACCESSORIES

| EXCH | | 52-WEEK RANGE (1) | CLOSE JUN 11 1986 | WEEK NET CHNGE | WEEK PCT CHNGE |
|---|---|---|---|---|---|
| N | AMERICAN BUS PRODS | 21- 36 | 32 5/8 | -3/8 | -1.1 |
| N | BARRY WRIGHT | 17- 29 | 23 5/8 | -1/8 | -0.5 |
| A | DUPLEX PRODUCTS INC | 13- 22 | 21 1/8 | -3/8 | -1.7 |
| N | ENNIS BUS. FORMS | 14- 28 | 26 1/4 | +1 1/8 | +4.4 |
| N | 3M COMPANY | 74- 107 | 106 3/4 | +1 3/8 | +1.3 |
| N | MOORE CORP LTD | 15- 27 | 24 5/8 | -3/8 | -1.5 |
| O | STANDARD REGISTER | 22- 45 | 39 3/4 | 0 | 0.0 |
| N | WALLACE COMP SERVICE | 30- 49 | 46 1/4 | -1 7/8 | -3.8 |

EXCH: N=NEW YORK; A=AMERICAN; P=PACIFIC; 6=BOSTON; L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER

O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

### SOFTWARE & DP SERVICES

| EXCH | | PRICE: 52-WEEK RANGE (1) | CLOSE JUN 11 1986 | WEEK NET CHNGE | WEEK PCT CHNGE |
|---|---|---|---|---|---|
| O | ADVANCED COMP TECH | 2- 6 | 5 1/4 | -3/4 | -12.5 |
| N | ADVANCED SYSTEMS INC | 9- 20 | 17 3/4 | +1/8 | +0.7 |
| N | AGS COMPUTERS INC | 10- 25 | 21 | +5/8 | +3.0 |
| O | AMERICAN SOFTWARE | 9- 15 | 12 1/2 | +1/2 | +4.1 |
| N | ANACOMP INC | 5- 11 | 6 1/4 | -1 | -13.7 |
| O | ANALYSTS INTL CORP | 2- 6 | 5 1/4 | -1/8 | -2.3 |
| O | ASHTON TATE | 6- 34 | 31 7/8 | -1 3/4 | -5.2 |
| O | ASK COMPUTER SYSTEMS | 7- 25 | 12 1/4 | -3/4 | -5.7 |
| 6 | ASTRADYNE COMP IND | 1- 3 | 1 5/8 | 0 | 0.0 |
| N | AUTOMATIC DATA PROC | 18- 39 | 36 | -1/2 | -1.3 |
| O | COMPUTER NETWORK | 5- 9 | 7 5/8 | 0 | 0.0 |
| O | COMPUTER ASSOC INT'L | 9- 25 | 24 1/2 | -1/4 | -1.0 |
| O | COMPUTER HORIZONS | 5- 11 | 11 1/8 | -2 3/4 | -19.8 |
| N | COMPUTER SCIENCES | 13- 39 | 38 1/2 | +1 5/8 | +4.4 |
| O | COMPUTER TASK GROUP | 7- 19 | 17 1/4 | -1 | -5.4 |
| O | COMPUTER USAGE | 1- 3 | 1 5/8 | -1 1/8 | -40.9 |
| O | COMPUTONE SYSTEMS | 3- 11 | 3 1/8 | -1/2 | -13.7 |
| O | COMSERV CORP | 1- 6 | 3 1/2 | 0 | 0.0 |
| O | COMSHARE | 7- 13 | 13 1/8 | 0 | 0.0 |
| N | CULLINET SOFTWARE | 12- 33 | 15 1/8 | -3/4 | -4.7 |
| O | CYCARE SYSTEMS INC | 13- 27 | 16 | -1 | -5.8 |
| O | HOGAN SYSTEM INC | 4- 12 | 11 3/4 | +1/4 | +2.1 |
| N | GENERAL ELECTRIC CO | 56- 61 | 79 5/8 | -1 5/8 | -2.0 |
| N | GENL MOTORS E (EDS) | 20- 49 | 47 1/2 | -1 | -2.0 |
| N | GTE CORP | 38- 54 | 51 | +1 3/4 | +3.5 |
| O | INFORMATION SCIENCE | 1- 5 | 3 3/8 | +1/8 | +3.8 |
| O | INFOTRON SYSTEMS CP | 13- 24 | 15 | -1 1/2 | -9.0 |
| O | KEANE ASSOCIATES | 10- 20 | 14 1/2 | +1 | +7.4 |
| N | LOGICON | 25- 43 | 35 | -7/8 | -2.4 |
| O | LOTUS DEVELOPMENT CP | 15- 38 | 37 3/4 | -1/2 | -1.3 |
| O | MCI COMMUNICATIONS | 7- 13 | 9 3/4 | +1/2 | +5.4 |
| O | MNGT SCI AMER INC | 7- 16 | 15 1/2 | -1/2 | -3.1 |
| O | MATHEMATICAL APP GRP | 1- 8 | 1/2 | 0 | 0.0 |
| O | MICOM SYSTEMS INC | 12- 35 | 13 3/4 | +3/4 | +5.7 |
| O | MICROPRO INT'L CP | 2- 4 | 2 1/2 | +1/8 | +5.2 |
| O | NATIONAL DATA CORP | 8- 25 | 21 3/8 | -1 5/8 | -7.0 |
| O | ON-LINE SOFTWARE INT | 4- 16 | 15 | -1/2 | -3.2 |
| N | PANSOPHIC SYSTEMS | 14- 35 | 32 1/4 | -3 | -8.5 |
| N | PLANNING RESEARCH | 11- 23 | 19 1/2 | -1/2 | -2.5 |
| O | POLICY MGMT SYSTS CP | 16- 35 | 19 | -1 1/4 | -6.1 |
| O | PROGRAMMING & SYS | 4- 10 | 10 | +1/2 | +5.2 |
| O | REYNOLDS & REYNOLD | 30- 65 | 33 3/4 | -3/4 | -2.1 |
| O | SEI CORP | 13- 27 | 19 3/4 | -2 3/4 | -12.2 |
| O | SHARED MEDICAL SYST | 26- 38 | 32 1/8 | -3 1/8 | -8.8 |
| O | SCIENTIFIC COMPUTERS | 4- 8 | 4 3/4 | 0 | 0.0 |
| O | SOFTWARE AG | 12- 22 | 19 3/4 | 0 | 0.0 |
| N | URS CORP | 10- 18 | 17 3/8 | +1/2 | +2.9 |
| N | UCCEL | 11- 23 | 21 1/4 | -1 1/2 | -6.5 |
| O | VM SOFTWARE | 17- 31 | 29 1/4 | -2 | -6.3 |

### SEMICONDUCTORS

| EXCH | | 52-WEEK RANGE (1) | CLOSE JUN 11 1986 | WEEK NET CHNGE | WEEK PCT CHNGE |
|---|---|---|---|---|---|
| N | ADVANCED MICRO DEV | 22- 36 | 25 | +3/8 | +1.5 |
| O | ADV'D SEMICONDUCTOR | 7- 23 | 10 1/4 | -3/4 | -6.8 |
| N | ANALOG DEVICES INC | 14- 24 | 20 | -1/2 | -2.4 |
| O | ANALOGIC CORP | 11- 18 | 12 1/2 | -1/4 | -1.9 |
| N | APPLIED MAGNETICS CP | 9- 19 | 17 | -1 1/2 | -8.1 |
| O | AVANTEK | 18- 26 | 18 1/2 | -3/4 | -3.8 |
| O | HADCO CORP | 3- 7 | 4 7/8 | -1/8 | -2.5 |
| O | INTEL CORP | 21- 33 | 24 3/4 | -1 1/2 | -5.7 |
| O | MICRO MASK INC | 5- 12 | 5 1/4 | +1/4 | +5.0 |
| N | MOTOROLA INC | 29- 48 | 43 5/8 | -2 1/8 | -4.6 |
| N | NAT'L SEMICONDUCTOR | 10- 15 | 13 1/4 | -1/4 | -1.8 |
| N | TERADYNE | 17- 33 | 24 | -2 3/4 | -10.2 |

### PERIPHERALS & SUBSYSTEMS

| EXCH | | PRICE: 52-WEEK RANGE (1) | CLOSE JUN 11 1986 | WEEK NET CHNGE | WEEK PCT CHNGE |
|---|---|---|---|---|---|
| P | AM INTERNATIONAL | 3- 6 | 7 3/4 | -1/4 | -3.1 |
| A | ANDERSON JACOBSON | 2- 5 | 2 1/8 | -1/8 | -5.5 |
| O | AST RESEARCH INC | 7- 33 | 14 3/8 | -1 1/8 | -7.2 |
| O | AUTO-TROL TECHNOLOGY | 3- 13 | 4 3/8 | 0 | 0.0 |
| O | AVANT-GARDE COMPUTNG | 3- 21 | 4 | -1/4 | -5.6 |
| O | BANCTEC INC | 8- 13 | 11 3/4 | -3/4 | -6.0 |
| O | BEEHIVE INT'L | 1- 2 | 1/8 | 0 | 0.0 |
| N | BOLT,BERANEK & NEW | 20- 48 | 47 1/2 | +1/8 | +0.2 |
| O | CAMBEX CORP | 1- 3 | 1 1/2 | +1/4 | +20.0 |
| N | CENTRONICS DATA COMP | 3- 11 | 6 7/8 | -1/4 | -3.5 |
| A | CETEC CORP | 6- 9 | 7 1/4 | +1/8 | +1.7 |
| A | COGNITRONICS | 4- 7 | 4 | -1/8 | -3.0 |
| N | COMPUGRAPHIC CORP | 23- 36 | 23 5/8 | -1/8 | -0.5 |
| O | COMPUTER TRANSCEIVER | 0- 1 | 3/4 | 0 | 0.0 |
| N | COMPUTERVISION CORP | 9- 44 | 15 5/8 | -1 | -6.0 |
| N | CONRAC CORP | 12- 16 | 16 5/8 | -1/8 | -0.7 |
| A | DATAPRODUCTS CORP | 11- 20 | 17 | -1/2 | -2.8 |
| A | DATARAM CORP | 4- 17 | 12 | -2 5/8 | -17.9 |
| O | DATA SWITCH CORP | 4- 9 | 7 | -3/8 | -5.0 |
| O | DATUM INC | 5- 9 | 6 1/4 | -1/4 | -3.6 |
| O | DECISION IND CORP | 10- 20 | 14 | -1/2 | -3.4 |
| O | ENDATA, INC | 2- 8 | 6 3/4 | +1/2 | +6.0 |
| O | EVANS & SUTHERLAND | 12- 27 | 23 7/8 | -1 1/2 | -5.9 |
| O | GANDALF TECHNOLOGIES | 5- 13 | 7 1/8 | +3/4 | +11.7 |
| N | GEN'L DATA COMM IND | 8- 21 | 12 5/8 | -1 1/4 | -9.0 |
| N | HAZELTINE CORP | 17- 30 | 16 5/8 | -7/8 | -5.0 |
| O | ICOT CORP | 3- 12 | 10 3/8 | -1 3/8 | -11.7 |
| O | INFORMATION INTL INC | 10- 17 | 15 | -1/8 | -0.8 |
| O | INTECOM INC | 3- 11 | 5 3/8 | -1/4 | -4.3 |
| O | MEGADATA CORP | 3- 8 | 3 1/4 | -1/8 | -3.7 |
| A | MSI DATA CORP | 7- 14 | 13 7/8 | 0 | 0.0 |
| N | NASHUA CORP | 24- 53 | 51 1/8 | -1 7/8 | -3.5 |
| O | NETWORK SYSTEMS CORP | 11- 27 | 14 1/4 | +1/4 | +1.7 |
| N | NO AMERICAN PHILIPS | 32- 47 | 43 1/8 | -7/8 | -1.9 |
| N | NORTHERN TELECOM LTD | 26- 41 | 29 1/8 | +1/8 | +0.4 |
| O | OMEX | 1- 3 | 1/2 | +1/8 | +33.3 |
| N | PARADYNE CORP | 8- 16 | 9 3/8 | -7/8 | -8.5 |
| A | PENRIL CORP | 7- 14 | 7 1/2 | +1/8 | +1.6 |
| N | PLESSEY CO (ADR) | 19- 36 | 32 1/8 | +1/8 | +0.3 |
| O | PRINTRONIX INC | 9- 16 | 13 | -1/4 | -1.8 |
| O | QMS INC | 6- 16 | 14 1/4 | +3/8 | +2.7 |
| O | RAMTEK CORP | 2- 7 | 5 3/4 | +1/8 | +2.2 |
| N | RECOGNITION EQUIP | 9- 17 | 12 1/2 | -1/2 | -3.8 |
| N | SANDERS ASSOCIATES | 29- 44 | 29 | +1/4 | +0.8 |
| O | SCAN-TRON CORP | 9- 22 | 21 1/4 | -1/4 | -1.1 |
| N | SCIENTIFIC ATLANTA | 10- 15 | 10 1/2 | -3/8 | -3.4 |
| O | SEAGATE TECHNOLOGY | 5- 13 | 11 7/8 | -1 | -7.7 |
| N | STORAGE TECHNOLOGY | 1- 5 | 3 3/4 | -1/4 | -6.2 |
| O | SYKES DATATRONICS | 0- 2 | 1/8 | | -14.1 |
| A | T BAR INC* | 5- 9 | 6 1/4 | + 3/8 | +6.3 |
| A | TAB PRODUCTS CO | 9- 15 | 15 | +1 | +7.1 |
| O | TANDON CORP | 3- 9 | 7 1/4 | +1/2 | +7.4 |
| A | TEC INC | 5- 13 | 5 1/8 | -1/8 | -2.3 |
| N | TEKTRONIX INC | 47- 68 | 59 3/4 | +1/2 | +0.8 |
| N | TELEX | 34- 68 | 59 1/2 | -4 5/8 | -7.2 |
| O | TESDATA SYSTEMS CP | 0- 3 | 1/2 | -1/8 | -27.3 |
| N | TIMEPLEX INC | 15- 23 | 17 1/4 | -1/4 | -1.4 |
| N | TITAN CORP | 4- 11 | 9 | -1/2 | -5.2 |
| O | VISUAL TECHNOLOGY | 1- 3 | 1/2 | 0 | 0.0 |

### LEASING COMPANIES

| EXCH | | 52-WEEK RANGE (1) | CLOSE JUN 11 1986 | WEEK NET CHNGE | WEEK PCT CHNGE |
|---|---|---|---|---|---|
| N | COMDISCO INC | 7- 24 | 21 5/8 | +1 3/4 | +8.6 |
| N | CONTINENTAL INFO SYS | 5- 11 | 10 5/8 | +3/4 | +7.5 |
| O | FINALCO GROUP INC | 3- 5 | 3 1/8 | 0 | 0.0 |
| O | PHOENIX AMERICAN INC | 2- 6 | 4 1/4 | -1/4 | -5.5 |
| O | SELECTERM INC | 6- 12 | 7 1/8 | 0 | 0.0 |
| N | U.S. LEASING | 32- 46 | 41 3/8 | +1/8 | +0.3 |

# COMPUTER INDUSTRY

## INSIDE

Controlled innovation is the key to success in the computer industry, a leading consultant says/**132**

Japanese vendors urged to shift production overseas to ease trade tensions/**134**

Sperry beats Burroughs, two others for a $250 million U.S. Army contract/**137**

Data General closes two peripherals plants, lays off 400/**172**

## INSTANT ANALYSIS

*"It has been said that a niche market is one in which the Japanese don't compete."*

**— Richard D. Skinner, president, Integrated Circuit Engineering Corp.**

# Private-label PCs to hit mart

## Two major chains will sell IBM clone under own name

**By Douglas Barney**

The recent decisions by Businessland, Inc. and Computerland Corp. to market their own personal computers have sparked debate over the potential impact on other micro vendors that rely primarily upon the retail market for sales.

Businessland announced last week that it would begin selling a co-labeled IBM Personal Computer AT compatible manufactured by Wyse Technology, Inc. in mid-July. The $3,295 machine, called the Businessland PC286, will be made in Taiwan and will be sold through Businessland's sales force of about 750.

"If those products are going to have good margins, the retail chains are going to push their sales force to sell their own products," said Bruce R. Watts, an analyst with Morgan Keegan, Inc. "Doesn't that inevitably lead to an inventory backup for everybody else's products that they are selling?"

But Businessland and some micro vendors downplay the private-label impact on sales of other IBM compatibles. The Wyse machine will not impact sales of other products because it will be sold primarily to highly price-sensitive markets such as government sales, said Michael S. Swavely, vice-president of marketing for Compaq Computer Corp.

Businessland agrees. "We expect our total market to expand, and this product will generate incremental sales," said Suzanne Crocker, director of communications for Businessland. Crocker did concede, however, that sales of the Wyse product may limit the growth in sales of other AT-compatible products.

"When you commit to the dealer channel, you get the benefits, but you are also

See **PRIVATE-LABEL** page 172

# Judge OKs new MDS directors

**By Clinton Wilder**

SAN FRANCISCO — A federal judge last week failed to block the appointments of arbitrageur Asher B. Edelman and New York attorney Michael D. Brown as new directors of Mohawk Data Sciences Corp. (MDS). But former director Thomas K. Christo vowed to continue the legal battle to regain both his seat and that of former director Francis P. Lucier on the three-member board.

Judge Robert F. Peckham refused to grant a temporary restraining order sought by Christo and Lucier against MDS President, Chief Executive Officer and Director Matthew V. Tutino, who replaced the two directors June 6. Edelman, the takeover specialist who controls roughly 10% of MDS' stock, was also named chairman.

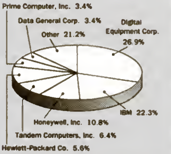
Christo said the MDS management situation remains in limbo pending the out-

See **JUDGE** page 172

## DATA VIEW

JEFF BABINEAU

### Minicomputer market share: DEC tops IBM



Figures represent 1985 worldwide market shares of medium-scale systems, supporting 17 to 128 users and priced between $100,000 and $1 million.

Information provided by International Data Corp. from a data base of 180,430 systems

## INDUSTRY INSIGHT

Clinton Wilder

# NCC no-shows raise questions

The long list of vendor no-shows for the 1986 National Computer Conference opening today in Las Vegas suggests that this year's show might be dubbed "All Quiet on the Western Front."

The conspicuous absence of Digital Equipment Corp., Data General Corp., Wang Laboratories, Inc., NCR Corp., Control Data Corp. and dozens of other heavyweights is a telling sign of not only the health of trade shows in general, but the state of the computer industry as the summer dog days approach. While things are clearly not as bad as they were during the depths of the industry downturn a year ago, most major vendors continue to experience a frustrating post-slump dormancy.

In 1985, dozens of companies, financially reeling from an unexpected slump that seemed to hit many all at once, pulled out of NCC at the last minute in a frantic effort to trim expenses — or cut losses. Eleven months and thousands of layoffs later, only the most troubled vendors are still operating in the red. But exhibiting at NCC has not come back into fashion — and possibly never will.

Computer firms may be hiring again, but they are watching the bottom line closely. Apple Computer, Inc. (itself a no-show at a recent microcomputer showcase, Comdex/Spring '86) is the most extreme example, with its lowered revenue producing record earnings and stock prices. At Apple and other firms, constricted marketing budgets clearly leave little room for the huge,

See **NO-SHOWS** page 138

*Wilder is* Computerworld's *senior editor, computer industry.*

# U.S. vendors find rules, users different in European market

## Patience, local flavor necessary in marketing

**FIRST** OF THREE PARTS

**By John Lamb, Janette Martin and Amiel Kornel**
Computerworld News Service

LONDON — When Tandem Computers, Inc. launched its latest VLX computer system at the U.S. Embassy in London's high-rent Grosvenor Square in April, the company made little secret of its transatlantic origins. Journalists were treated to rock'n'roll by the Eagles and served American beer and hamburgers by what we are saying than our parent company in Cupertino, Calif.," explains the company's UK marketing manager, Mike Lambert.

But while Tandem, whose UK operation is the firm's largest outside the U.S., is confident enough to make a virtue out of its foreign origins, other U.S. computer firms have to tread lightly on this side of the Atlantic.

British business may speak the same language as its American counterpart, but its ways are very different. U.S. companies working throughout Europe have learned that success in the Old World means unraveling a tangle of local dialects, cultures, laws and customs.

says. "The message has got to be the same in Tokyo, Hong Kong, Frankfurt and London, although we go about saying it in different ways in different places."

"Several flavors of Computerland have to be present even if they are all ice cream," explains Rick Peterson, products and marketing director at Luxembourg-based Computerland Europe.

Setting up 77 franchises in 15 European countries, the international personal computer dealer quickly learned to apply a regional concept, Peterson says. "Don't try to take a typical American package and make it fly in Europe," he warns.

One lesson that U.S. firms quickly

says Hugh Small, management consultant at Arthur D. Little, Inc.'s London office. "There tends to be a caste of employees in large companies who don't have buying responsibility but have power, because it is they who evaluate new products for a central procurement agency. Suppliers have to be patient and respond to lengthy requests for proposals."

British buyers are unlikely to be impressed by the argument that they can get ahead of rivals by buying the latest technology. "We don't see any evidence of companies aggressively using technology to achieve a commercial advantage," Small says. "Quite the reverse. The principal factor that motivates UK buyers is the

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